LPC# 199 801 0003 Madison County
Chemetco - Hartford
ILD 048 843 809
SF/HRS

Expanded Site Inspection

Prepared by:
Office of Site Evaluation
Division of Remediation Management
Bureau of Land

CERCLA
EXPANDED SITE INSPECTION

For:

CHEMETCO
ILD 048 843 809
HARTFORD, ILLIOIS

PREPARED BY:
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
BUREAU OF LAND
OFFICE OF SITE EVALUATION

October 3, 2008

SIGNATURE PAGE

Title: CERCLA Expanded Site Inspection for Chemetco

Preparer: Lance L. Range, Project Manager, Office of Site Evaluation, Illinois Environmental Protection Agency

Signature — Date: 12/19/08

Reviewer: Tom Crause, Office Manager, Office of Site Evaluation, Illinois Environmental Protection Agency

Signature — Date

Approval: Laura J. Ripley, Environmental Scientist, United States Environmental Protection Agency, Region 5

Signature: Erica Adler for Laura J. Ripley — Date: 1/20/09

The approval signatures on this page indicate that this document has been authorized for information release to the public through appropriate channels. No other forms or signatures are required to document this information release.

TABLE OF CONTENTS

SECTION Page

APPENDICES

A Figures
B Tables
C Maps of Perched Shallow Groundwater Flow from CSD Environmental Services. January 1996.
D Sampling Photographs
E April 1, 2008 Site Reconnaissance

FIGURES (in Appendix A)

1 Site Location Map
2 Site Area Map
3 Soil Sample Location Map
4 Waste Sample Location Map
5 Sediment Sample Location Map
6 Monitoring Well Location Map
7 Residential Well Location Map
8 Wetland Map
9 Fifteen-Mile Surface Water Drainage Map
10 4 Mile Radius Map
11-13 XRF Location Maps
14 Chemetco Facility Map

TABLES (in Appendix B)

1 Sample Descriptions
2 Chemetco Facility Soil Sample Results
3 Waste Sample Analytical Results
4 Sediment Sample Analytical Results
5 Monitoring Well Groundwater Inorganic Sample Analytical Results
6 Residential Groundwater Sample Analytical Results
7 Monitoring Well Groundwater Organic Sample Analytical Results
8 XRF Residential Results

SECTION 1.0 INTRODUCTION

On May 21, 2007, the Illinois Environmental Protection Agency's (Illinois EPA) Office of Site Evaluation was tasked by the United States Environmental Protection Agency (U.S.EPA) to conduct a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Expanded Site Inspection at Chemetco located near Hartford, Illinois. The site is in the Southeast ¼ of Section 16, Township 4 North, Range 9 West of the Third Principal Meridian, in Madison County. See Figure 1 and Figure 2 for the location of the site and Figure 14 for a Chemetco facility map. The site is also located at latitude 38.79938 and longitude -90.09971. The site is designated by the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) database as ILD 048 843 809.

The primary objective of an Expanded Site Inspection is to address critical hypotheses or assumptions that were not completely supported during the Site Inspection. The Expanded Site Inspection will gather information to fully establish background conditions, fill in data gaps, or establish attribution to site operations. At the conclusion of the Expanded Site Inspection, it will be determined whether the site qualifies for possible inclusion on the National Priorities List (NPL) or should be dropped from further Superfund consideration. Additionally, the Expanded Site Inspection supports removal and enforcement actions and collects data to support further Superfund or other response actions.

The Expanded Site Inspection is not intended to be a detailed extent of contamination or risk assessment. Efforts requiring intensive background investigation or specialized techniques are normally conducted during the next phase in the Superfund process after a site is placed on the NPL and becomes eligible for remedial funding. The Expanded Site Inspection is performed

under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) commonly known as Superfund.

Chemetco was placed on CERCLIS in 1980 and a Preliminary Inspection was completed at the site on February 5, 1986. A Site Inspection was completed on November 3, 1987 and the site designated as a No Further Remedial Action Planned (NFRAP). At that time the site was given a "no further action" referral since the site was regulated under Resource Conservation Recovery Act (RCRA) regulations. In 2002 it was determined that the site should be reassessed under CERCLA since RCRA regulations would not cover the entire scope of the potential environmental problems at the site. On September 9, 2002, an Expanded Site Inspection was completed on the property. Since the 2002 inspection, Chemetco has been in the process of liquidating equipment from the property. Upon discussion within Illinois EPA and with U.S.EPA, it was concluded that the Chemetco property should be investigated again in order to determine if contamination still exists on and around the facility.

In April of 2008, the Illinois EPA's Office of Site Evaluation prepared and submitted a work plan for the Chemetco site to the Region V offices of the U.S.EPA. The sampling portion of the Expanded Site Inspection was conducted on May 5-9 and 13-14, 2008. During the ESI, the Illinois EPA sampling team collected twenty-four sediment, eight soil, nine slag/waste samples. four residential well samples and four monitoring well samples from the Chemetco facility and surrounding area. The 2008 ESI was conducted to help determine the levels of contamination present at the Chemetco facility as well as any receptors which could potentially be impacted by former activities at the site. These potential receptors include designated wetlands, environmental and aquatic wildlife and human receptors.

SECTION 2.0 SITE BACKGROUND

SECTION 2.1 SITE DESCRIPTION

The Chemetco facility is located within a primarily agricultural, light residential area south of Hartford, Illinois northeast of the intersection of Illinois Route 3 and Oldenburg Road in Madison County. Chemetco operations were conducted on a 41.1-acre parcel of land surrounded by a chain link fence, which restricts access to this portion of the property. Chemetco owns an additional 230 acres of land surrounding the facility. The Chemetco facility is located in the former floodplain of the Mississippi River in an area referred to as the American Bottoms. The Mississippi River levee system in the area prevents the site from being flooded by the Mississippi River. The Chemetco facility is located in the Illinois 12th Congressional District. A Facility Map can be found in Appendix A, Figure 14.

The Chemetco facility was constructed in 1969 and began operations as a copper smelter in 1970. The Chemetco facility produced anode copper, cathode copper and crude lead-tin solder and zinc oxide. They utilized four furnaces to melt scrap metal and other wastes and then extract copper and other saleable byproducts. A by-product resulting from this process was an iron/silicate slag. The facility generated three other primary solid waste streams, which are zinc oxide, baghouse dust, and spent refractory brick.

Waste slag at the Chemetco facility was generated from both water-cooled and air-cooled processes. The water-cooled slag was crushed, dried and screened for correct particle size and then sold as a material to use as roofing shingle backing. The air-cooled slag was stored on-site in large slag piles, which remain at the site today. The slag piles are located mainly on the

eastern portion of the facility property and cover approximately thirteen acres. It is estimated that approximately 836,653 tons of this slag currently exists on the property (Hurst-Rosche Engineers, Inc Memo dated April 17, 2007). This slag contains elevated levels of lead and copper and fails Toxic Characteristic Leaching Procedure (TCLP) hazardous waste tests for lead.

There are over 60 metric tons of spent refractory brick left in the furnaces. Another 10 tons of brick are located outside the foundry building. There is speculation that there is an unknown amount of brick located/buried in the Truck Parking Lot. Spent refractory bricks may contain elevated levels of chromium and other metal by-products.

In 1986, a ten-inch discharge pipe was discovered by Illinois EPA, which illegally discharged plant storm water into an area which entered the tributary of Long Lake, located just south of the facility (Ref. 13). This discharge contained oils and greases, metals and zinc oxide slurry which contained elevated levels of several metals. This illegal discharge area (entitled "zinc oxide spill") was discovered by the Illinois EPA during an inspection on September 18, 1996, but had been on-going. Evidence of the long term release of materials was noted by the lack of tree and weed vegetation during the September inspection. When the discharge was discovered, Chemetco was required to conduct remediation of the areas impacted by the zinc oxide discharge. This cleanup is discussed in great detail in the report entitled "Zinc Oxide Spill Remediation Plan" which can be found in the Illinois EPA Bureau of Land files under the identification number L1198010003 (Ref. 13). A limited cleanup of sediments was conducted downstream in Long Lake during these remediation activities.

On October 31, 2001, the facility was shut down and filed for bankruptcy. At that time, the U.S. Bankruptcy Court for the Southern District of Illinois and its appointed Trustee took

over the property. The property is currently abandoned with the exception for a small work crew which is being used to conduct operations to sell portions of the remaining products that are left at the facility. Currently, the U.S. Bankruptcy Court is working with the Illinois EPA to determine whether this slag can be sold and used for any beneficial purposes.

The overland segment is defined as the portion of the hazardous substance migration pathway beginning at a source and proceeding down-gradient to the probable point of entry (PPE) to surface water (Ref. 1, Sec. 4.1.1.1). Surface water is allowed to infiltrate the zinc oxide and slag piles and the truck parking area.

Surface water flow from the site generally drains to the south through at least three separate routes. Each of these routes will be discussed.

1. Surface water flowing from the zinc oxide pile would flow south. A portion of the water would flow to the southeast to the cooling canals. Water draining from the western portion of the site would flow south along the west side of the dome building. Water would then flow southwest across the asphalted surface of the Chemetco facility to the north side of the commercial offices, where the water was approximately 6 inches deep. The surface water would then continue to flow to the west to the ditch located on the west side of the facility. The overland flow/flood draining from the Chemetco facility was witnessed during a reconnaissance visit on April 1, 2008 (Ref. 25). During the reconnaissance inspection on April 1, 2008, photos were taken of surface water leaving the site from the west side of the Chemetco facility (Ref. 25, p. 1). Water from the west side of the facility was flowing adjacent to the railroad tracks in a ditch (Ref. 25, p. 1-3).

This ditch flowed south 0.16 miles and was directed to a culvert which went under the railroad tracks and Chemetco Lane (Ref. 25, p. 3-4). The water then continued to flow south along the roadside ditch of Illinois Highway Route 3 (Ref. 25, p.3-4) for 0.22 miles where the surface water reaches another culvert which directs the runoff Long Lake (Ref. 7, Ref. 25, p. 5-6). This location would be the PPE1 due to the presence of Long Lake and adjacent wetlands (Ref. 6, Ref. 1, Sec. 4.0.2). This overland flow segment is labeled OS 1 in Figure 4 and is color coded red. The PPE1 is depicted in Fig 4.

2. Surface water drainage from the large slag pile located in the northeast portion of the facility would drain to the cooling lagoons located on the west and south of this slag pile. The smaller slag piles located to the south of the lagoons would drain south to the concrete lined ditch and then continue east to the holding basin. The holding basin was seen to be overflowing during the reconnaissance and during the ESI. The overflowing water from the holding basin (Ref. 25, p. 14 - 15) was flowing south down the embankment into the tall grasses and phragmites (Ref. 25, p. 16). This surface water pathway became difficult to discern with the abundance of water in the area and the pathway through the abundant grasses and phragmites. This overland flow segment is depicted in Figure 4 as OS 2 and is color coded magenta. This is depicted in Fig. 4.

3. Surface water draining from the truck parking area located southwest of the fenced Chemetco facility empties into adjacent wetlands located at the southwest corner of the truck parking area (Ref. 25, p. 4 – 5). PPE 2 is designated in Figure 4 of this documentation record.

During the 2008 ESI, the water table in the area was high enough that groundwater could

be seen coming up in the asphalt on the road which runs on the south side of the facility. Groundwater was also seen coming up on the south side of the concrete culvert which parallels the asphalt road on the south side of the facility. This area is devoid of vegetation. This area is suspected of being impacted by a former acid pit and is void of vegetation. The acid pit also known as the floor wash water impoundment was removed from service and backfilled in 1981. This impoundment was not cleaned nor had remediation occurred prior to backfilling. Water from this area flows into Long Lake, although an exact probable point of entry was difficult to determine due to the amount of water in the area and vegetation in the wetland.

Drinking water in the area is obtained from the Upper and Lower Regional Aquifer. Local groundwater use in the area includes Chemetco's industrial use only well and 10 private wells located within one mile of the facility. The City of Roxanna has wells that are located within four miles of the Chemetco facility. These wells obtain water from approximately 100 feet in depth from the regional aquifer.

Forested and emergent wetlands are located adjacent to Long Lake for the majority of the surface water migration route downstream from Chemetco. These wetlands are designated on the 1988 National Wetlands Inventory Map of Wood River. The Illinois Department of Natural Resources website known as EcoCAT was consulted to determine if any protected resources were in the vicinity of the facility. EcoCAT reported that the Chouteau Botanical Area Illinois Natural Area Inventory(INAI) site is in the vicinity of the facility. EcoCAT did not report of any endangered or threatened species in the area (Ref. 16).

Section 2.1.1 Site Geology

The facility is located about one mile east of the confluence of Missouri and Mississippi Rivers in a flood plain area locally known as the American Bottoms. The American Bottoms topography is relatively flat and includes 175 square miles of Mississippi River flood plain. The American Bottoms area is approximately 30 miles long and ranges from about 3 to a maximum of 11 miles wide. extending from Wood River to the northeast part of Horseshoe Lake (Ref. 12, p. 17).

The American Bottoms is an area underlain by Pleistocene-age, unconsolidated valley fill deposits that range from 12 to 170 feet thick and average 120 feet in thickness. The soils in this area are higher in clay content, are poorly drained, and are often ponded (Ref. 12, p. 18). Generally the grain size sediments coarsens in the valley fill. A generalized cross section submitted by Chemetco depicts the area as underlain by top soil and slag fill which ranges in thickness from 0 to 11 feet. This is underlain by clay and silt with interbedded lenses of sand and silt. The interbedded sands and silts are predominant in the southeast corner of the site. Underlying the clay and silt is a sand layer containing some gravel and silt which ranges from 12 to 75 feet in thickness. A 50 foot sand and gravel layer underlies the finer sand unit. This is underlain by limestone bedrock (Ref. 13, p. 28).

Section 2.1.2 Site Hydrology

The principal water-bearing units beneath Chemetco are a Perched Shallow Aquifer and the Upper Regional Aquifer and the Lower Regional Aquifer. These zones are monitored by Chemetco and have been classified as Class I Groundwater (Zinc Oxide Spill Remediation Plan, April 1997, p. 30).

Section 2.1.2.1 Upper and Lower Regional Aquifer

The fine sand layer and the underlying coarse sand and gravel layer comprise the regional American Bottoms aquifer. There is no boundary between these formations in the regional aquifer, but they are two distinct geological units, given the gradation from silty sand to coarse sand and gravel (Ref. 13, p. 29). The clean sand and gravel deposits in the bottom zone of the American Bottoms aquifer constitute the major water producing zone in the area (Ref. 13, p. 29). The regional aquifer is generally greater than 90 feet thick and extends to bedrock (Ref. 13, p. 29). Local groundwater use in the area includes Chemetco's industrial use only well and 10 private wells located within one mile of the facility. The aquifer is a source of municipal, industrial water within the area (Ref. 13, p. 29). The limestone bedrock aquifer below the American Bottoms aquifer is highly mineralized and is not used for groundwater supplies (Ref. 13, p. 30).

Chemetco submitted flow maps for the first and second quarter sampling rounds in 2001. Groundwater flow direction in the lower regional aquifer was from the northeast to the southwest during the first quarter and from the west to the east during the second quarter. The upper and lower aquifer flow maps appear to coincide during these first two quarters of sampling.

Section 2.1.2.2 Perched Shallow Aquifer

The Chemetco facility is underlain by a clay and silty clay unit ranging from approximately 20 t0 60 feet in thickness. Inter-bedded within the clay in the southeastern quadrant of the facility is a sand lens (also referred to as the perched sand aquifer). The perched

sand aquifer extends from 5 to 20 feet below grade with a maximum thickness of 15 feet and is bounded above and below by the clay and silty clay. The results of site investigations indicate that the water flows from north to south across the southeastern quadrant of the facility. Data indicates that the water bearing formation does not extend to the facility northern and western boundaries and stops within 300 feet of the southern and eastern boundaries. A second sand and silt lens has been identified, based on water level elevations to the east of well 12 (Ref. 13, p. 32). Figures for the perched shallow groundwater flow are included in Appendix C of this report.

SECTION 2.2 SITE HISTORY

The company originated June 9, 1969, as an Illinois corporation, Chemico Metals Corporation, and was merged into a Delaware corporation of the same name March 23, 1970. Modern administrative and manufacturing facilities located near Hartford, Illinois were under construction for two years. In March of 1972, the company began production of copper in cathode form and in 1973 changed its name to Chemetco (Ref. 14, p. 2).

Chemetco had the capabilities for producing copper cathodes from copper oxide ores or precipitates. Its major function was recycling or secondary processing, of copper-bearing scrap and manufacturing residues. The operation entailed purchasing raw materials from throughout the United States and Canada (Ref. 14, p. 2).

Copper bearing raw materials arrived at the Chemetco site by truck and rail. Much of the raw materials consisted of electrical devices, equipment or cable. A certain percentage of raw materials was composed of such items as skimmings, slags, turnings, grindings and other

residues from foundries and factories, auto parts and building components (Ref. 15, p. 4)

A premix consisting of the copper-bearing raw material and other ingredients were smelted in one of the furnaces, producing black copper (containing small amounts of lead, tin and zinc). The black copper was further refined in the same type furnace utilizing blown oxygen, producing copper along with zinc oxide and a refining slag that was rich in lead and tin and contained some nickel. The resulting copper anodes are immersed in a chemical bath for purification purposes and the resulting copper cathodes are the primary product of Chemetco.

Leftover slag from operations was transported in molten form to storage areas, it was later graded and screened and used for thermal insulation, sandblasting aggregate, road bed fill and other applications. Other wastes produced from the smelting process included zinc oxide, bag house dust and spent refractory brick.

In 1986, a ten-inch discharge pipe was illegally discharging plant storm water into an area just south of the facility. This area was void of vegetation and continued south to Long Lake. This discharge contained oils and greases, metals and zinc oxide slurry which contained elevated levels of several metals. This illegal discharge area (entitled "zinc oxide spill") was discovered by the Illinois EPA during a routine Resource Conservation and Recovery Act (RCRA) inspection on September 18, 1996. Illinois EPA subsequently required Chemetco to conduct remediation of the areas impacted by the zinc oxide discharge. This cleanup is discussed in great detail in the report entitled "Zinc Oxide Spill Remediation Plan" dated April 1997 which can be found in the Illinois EPA Bureau of land files under the identification number ILD1198010003 (Ref. 13). Limited sediment removal was conducted downstream in Long Lake during these remediation activities.

On October 31, 2001, the facility was shut down and filed for bankruptcy on November 13, 2001. At that time, the U.S. Bankruptcy Court for the Southern District of Illinois appointed a Trustee to oversee the property. On December 7, 2001 the Illinois EPA issued an order to seal the Chemetco site. The Seal order restricts public access to certain portions of the site, and prohibits entry by anyone except specified personnel in the performance of their duties. The property is currently abandoned with the exception of a small work crew. Current site operations consist of selling portions of the remaining products that are left at the site.

Since the Seal Order was issued at the site, the Illinois EPA has pursued cleanup at the site as a Superfund Alternate Site (SAS). This initiative has failed to produce satisfactory results. Due to this failure, Illinois EPA has resumed CERCLA activities at the site, which include generating the necessary data in order to place the Chemetco site on the NPL.

SECTION 2.3 PREVIOUS INVESTIGATIONS

The Chemetco facility was initially placed on CERCLIS on August 1, 1980. A Preliminary Assessment was completed on the facility on February 5, 1986. A Site Inspection was completed on the Chemetco facility on November 3, 1987 and the site was subsequently archived on the same date (CERCLIS database) (http://cfpub.epa.gov/supercpad/cursites/cactinfo.cfm?id=0500342). The site was archived due to the areas of concern being addressed through the RCRA program. Over the years, Chemetco did not produce adequate closure plans for many of the Areas of Concern (AOC) at the facility.

In 2001, the Illinois EPA requested U.S.EPA to conduct a removal assessment, based on the fact that previous samples indicated hazardous levels of cadmium and lead were present.

Upon internal communication between Illinois EPA and U.S.EPA, it was decided that Chemetco be assessed as a Site Inspection. In 2002, the site was resurrected in the CERCLIS database and given a designation of a Site Reassessment on April 5, 2002. Illinois EPA completed an Expanded Site Inspection at the facility with a completion date of September 12, 2002 and suggested that it continue in the CERCLA process (Ref. 22). After the completion of the 2002 ESI, the Illinois EPA National Priorities Listing (NPL) section became involved with the discussions of the removal/selling of the waste/resources of Chemetco. The Illinois EPA NPL Unit distributed 104(e) letters in February 2008 (Ref. 2). The purpose of the 104(e) letter is to seek information from any person who has or may have information relevant to the site regarding the release or threat of release of hazardous substances.

SECTION 2.4 REGULATORY STATUS

Based upon the available file information, while Chemetco was in operation, the facility was subject to the Resource Conservation and Recovery Act (RCRA). RCRA focuses only on active or future facilities and does not address abandoned or historical sites which are managed under CERCLA. Information currently available does not indicate that the site is under the authority of the Atomic Energy Act (AEA), Uranium Mine Tailings Action (UMTRCA), or the Federal Insecticide Fungicide or Rodenticide Act (FIFRA).

SECTION 3.0 EXPANDED SITE INSPECTION ACTIVITIES

SECTION 3.1 SAMPLING ACTIVITIES

All samples will be collected in accordance with the Illinois EPA's Quality Assurance Project Plan (QAPP) and the Illinois EPA's Bureau of Land Sampling Procedures Guidance

Manual. Soil and sediment samples will be collected with stainless steel trowels or augers and put directly into sampling jars.

Section 3.1.1 Sediment Sampling

Twenty-four sediment samples were collected from Long Lake in May 2008 in order to determine if contaminants may have migrated from Chemetco into the lake. These samples were analyzed for the inorganic portion of the Target Compound List. All sediment samples were collected with a hand auger from the top six inches of sediment. The locations of the sediment samples are depicted in Figure 5 and the analytical results can be seen in Table 4. Sediment samples were collected following the procedures described in the Bureau of Land Sampling Procedures Guidance Manual (p. 10.6 – 10.7).

Section 3.1.2 Soil Sampling

Six soil samples were collected from an area of bare soil (acid spill area) located south of the fenced Chemetco property. Two soil samples were collected for background purposes. These samples were collected to help determine whether contamination from Chemetco has migrated to the sediments of Long Lake and could pose a hazard to the residents and aquatic environment.

The soil samples were collected with hand trowels and analyzed for the inorganics portion of the Target Compound List. All soil samples were collected within the top six inches of soil. The locations of the soil samples can be seen on Figure 3 and the complete analytical results can be seen in Table 2. Soil samples were collected following the procedures described in the Bureau of Land Sampling Procedures Guidance Manual (p. 6.7 – 6.8).

Section 3.1.3 Groundwater Sampling

Four residential groundwater samples were collected from four private wells on properties located in the vicinity of Chemetco. These samples were collected to help determine whether contamination from Chemetco has impacted the local groundwater and could pose a hazard to the residents who utilize this water for drinking purposes. These samples were analyzed for the entire Target Compound List (see Appendix C). All groundwater samples were collected directly from taps at the residences prior to going through any types of water treatment processes, except one. This exception was due to the inability to collect a water sample prior to the home filtration system. The locations of the residential groundwater samples can be seen on Figure 7 and the complete analytical results can be seen in Table 6. Private drinking water well samples were collected following the procedures described in the Bureau of Land Sampling Procedures Guidance Manual (p. 8.7 – 8.10).

Section 3.1.4 Waste Sampling

Nine samples were collected from various types of materials located on the Chemetco property. Two samples were collected from the slag parking area, three samples were collected from the zinc oxide pile, two samples were collected from the slag piles located at the northeastern portion of Chemetco and two samples were collected from slag piles located on the southern portion of the Chemetco property. These samples were collected to help determine the levels of contamination that exist on the Chemetco property and could potentially migrate to environmental receptors. These samples were analyzed for the inorganics portion of the Target Compound List and collected with hand trowels. The locations of the soil and slag samples can

be seen on Figure 4 and the analytical results can be seen in Table 3. Waste samples were collected following the procedures described in the Bureau of Land Sampling Procedures Guidance Manual (p. 5.7 – 5.8).

SECTION 3.2 ANALYTICAL RESULTS

Section 3.2.1 Sediment Sample Results

Twenty-four sediment samples were shipped to Datachem Laboratories located at 960 West LeVoy Drive in Salt Lake City, Utah for inorganic analysis. Sediment sample X224 was utilized as a background sample due to the sample location being up-gradient of the facility on the west side of Route 3. All sediment samples were collected from 0 -6 inches from similar clays located in the tributary and Long Lake. Inorganic analysis revealed significantly elevated levels of aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, copper, iron, manganese, mercury, nickel, selenium, silver, sodium, thallium, and zinc. Refer to Table 4 for the inorganic results for sediment samples.

Section 3.2.2 Soil Sample Results

Eight soil samples were shipped to Datachem Laboratories located at 960 West LeVoy Drive in Salt Lake City, Utah for inorganic analysis. Six of the soil samples were collected from the acid spill area located on the south side of the facility. This area was devoid of vegetation and has long been suspected of being impacted by a former acid pit. This former pit was filled in 1981. No remediation or cleanup activities occurred on the pit prior to backfilling. Two samples were collected from the west of the site in an undisturbed area. Soil sample media was similar in

nature being brown silt to brown silty clay. All samples were collected within the 0 – 6 inches from the surface of the soil.

Soil samples X107 and X108 were collected from an undisturbed area to the west of the facility and represent background conditions. Soil sample X107 contained higher levels of background constituents than did X108. Due to the higher values, X107 will be used as the background concentration.

Upon comparison to background concentrations, nickel and sodium exceeded three times the background levels for soil samples X101-X106. Copper exceeded three times the background levels for soil samples X101, X103-X106. Soil sample X105 revealed beryllium, cadmium, calcium, cobalt, lead, manganese, silver, and zinc as well as copper, nickel and sodium significantly above background concentrations (Table 2).

Section 3.2.3 Groundwater Sample Results

Residential groundwater samples were delivered to Mitkem Laboratories, located at 175 Metro Center Blvd in Warwick, Rhode Island for organic analysis. Groundwater sampling results for the Residential Wells did not reveal any organic constituents in the drinking water (Table 6).

Groundwater samples were analyzed for inorganic constituents by Datachem Laboratories located at 960 West LeVoy Drive in Salt Lake City, Utah. Residential groundwater samples analyzed for inorganic constituents did not reveal any contamination.

Monitoring well groundwater sample G204 was collected from monitoring well 47R. This well is screened in the deeper aquifer underlying the site. Due to the inability to locate and

sample another deep monitoring well, this sample will be compared to Maximum Contaminant Level (MCL) criteria (Table 5).

The other monitoring well samples were collected from the shallow perched aquifer located to the south of the facility. The inorganic analysis of these wells indicated that groundwater sample G203 and G203F exceeded three times the MCL for arsenic, cadmium, copper and selenium (Table 5). The shallow perched aquifer samples were also compared to MCLs.

Section 3.2.4 Waste Sample Results

Nine waste samples were shipped to Datachem Laboratories located at 960 West LeVoy Drive in Salt Lake City, Utah for inorganic analysis. Inorganic analysis revealed elevated levels of beryllium, cobalt, copper, lead, nickel, sodium and zinc for all nine waste samples. Antimony, barium, cadmium, calcium, chromium, iron, manganese, mercury, selenium, and silver significantly exceeded background concentrations in at least two waste samples. Waste sample results can be viewed in Table 3.

SECTION 4.0 SITE SOURCES

SECTION 4.1 INTRODUCTION

This section includes descriptions of the various hazardous waste sources that have been identified at the Chemetco. The Hazard Ranking System defines a "source" as: "Any area where a hazardous substance has been stored, disposed or placed, plus those soils that have become contaminated from migration of hazardous substance." This does not include surface water or sediments below surface water that has become contaminated.

Information obtained during the Expanded Site Inspection identified three separate source areas. These sources areas were identified as the slag pile, the zinc oxide pile and the truck parking lot. As additional information becomes available, the possibility exists that additional sources of contamination may exist.

This section will briefly discuss the hazardous waste sources which have been identified through CERCLA site investigation process. Three waste piles and two spill areas have been identified.

SECTION 4.2 SLAG PILE

A waste product resulting from the secondary smelting processes that took place at Chemetco is slag material. The air-cooled slag material was retained on site, mainly in the eastern portion of the property (see Figure 14). Over the years, these piles grew to a large size and now cover an estimated area of thirteen acres. There is not a cap or liner to prevent the contaminants from being spread off site via the air, groundwater or surface water pathway. These slag piles are estimated to have approximately 836,653 tons of slag.

Four samples were collected from these slag piles (X306-X309). These four samples were collected from the 0 – 4 inches from the surface of the slag piles. The analytical results from these samples were found to contain significantly elevated levels of beryllium, cadmium, chromium, copper, iron, lead manganese, mercury, nickel, silver, sodium and zinc. Table 3 shows the concentrations of these contaminants that were detected in the on-site slag and Figure 4 shows the locations of these samples.

Contaminants from these waste piles have migrated to Long Lake which is located to the

south of the facility. Wetlands located along Long Lake have been impacted by the contaminants from the waste piles. Contaminants which have migrated to Long Lake may be impacting the local community due to Long Lake being adjacent to many homes and yards.

SECTION 4.3 ZINC OXIDE PILE

Zinc oxide is a particulate material which was collected from the foundry furnaces exhaust gases. A bunker approximately 2.7 acres in size and storing approximately 35,000 tons of zinc oxide is located on the northern portion of the facility (see Figure 14). Three samples were collected from this area (X303 – X305) and were found to contain high levels of antimony, barium, beryllium, cadmium, calcium, cobalt, copper, lead, mercury, nickel, selenium, silver, sodium and zinc. There is no cap or liner to help prevent the contaminants from being spread off site via the air, groundwater or surface water pathways. Table 3 shows the concentrations of these contaminants that were detected in the zinc oxide on site and Figure 4 shows the locations of these samples.

Contaminants from the zinc oxide piles have migrated to Long Lake which is located to the south of the facility. Wetlands located along Long Lake have been impacted by the contaminants from the zinc oxide piles. Contaminants which have migrated to Long Lake may be impacting the local community due to Long Lake being adjacent to many homes and yards.

SECTION 4.4 TRUCK PARKING AREA (SLAG)

It should be noted that the truck parking lot located just south of the main facility property is also composed of slag material. The parking lot was built in 1980 and currently occupies approximately 3.3 acres of land just north of Long Lake. Two samples (X301 and

X302) were collected from this parking area and were found to contain significantly elevated levels of antimony, beryllium, cadmium, calcium, cobalt, copper, iron, lead, mercury, nickel, silver, sodium and zinc. There is no cap or liner to help prevent the contaminants from being spread off site via the air, groundwater or surface water pathways. The depth of the slag material with which the parking lot was made is unknown. At this time, there are rumors of spent refractory brick being buried/backfilled under the slag parking lot.

Contaminants from this waste pile have migrated to Long Lake which is located to the south of the facility. Surface water is allowed to flow over the truck parking lot and was observed entering into the wetlands, which are located at the southwest corner of the parking lot. Wetlands located along Long Lake have been impacted by the contaminants from the pile. Contaminants which have migrated to Long Lake may be impacting the local community due to Long Lake being adjacent to many homes and yards.

SECTION 4.5 OTHER POSSIBLE SOURCES

SECTION 4.5.1 ZINC OXIDE SPILL

In 1986, a ten-inch discharge pipe was discovered which was illegally discharging plant storm water into an area which entered a tributary of Long Lake. This discharge would have contained oils and greases, metals and zinc oxide slurry which contained elevated levels of several metals. This illegal discharge area was discovered by the Illinois EPA during a routine inspection on September 18, 1996. When this was discovered, Chemetco was required to conduct remediation of the areas impacted by the zinc oxide discharge. This cleanup is discussed in great detail in the report entitled "Zinc Oxide Spill Remediation Plan"(Ref. 13). A limited cleanup of sediments was conducted downstream in Long Lake during these remediation activities. The origin of the discharge pipe was never identified from any particular area of the facility. It is assumed that the discharge pipe originated in the southwest cooling lagoon, but this has not been verified.

Contamination from the zinc oxide has been documented in the sediments of Long Lake. Wetlands which are located along Long Lake have been impacted by the contamination.

SECTION 4.5.2 ACID SPILL AREA

The source for the acid spill area is assumed to be the former acid pits (Figure 14, southeast corner of fenced site) which were backfilled prior to any remediation in 1981. The acid spill area was devoid of vegetation. Size of the area devoid of vegetation is approximately 40,000 square feet or 0.9 of an acre. Two samples were collected from the west of the site in an undisturbed area. Soil sample media was similar in nature being brown silt to brown silty clay.

All samples were collected within the 0 – 6 inches from the surface of the soil.

Upon comparison to background concentrations, nickel and sodium exceeded three times the background levels for nickel and sodium for soil samples X101-X106. Copper exceeded three times the background levels for soil samples X101, X103-X106. Soil sample X105 revealed beryllium, cadmium, calcium, cobalt, lead, manganese, silver, and zinc as well as copper, nickel and sodium significantly above background concentrations.

Contamination from the acid spill area is impacting Long Lake and the wetlands located along Long Lake.

Fish and wildlife that utilize Long Lake and the associated wetlands are being impacted by the elevated levels of inorganics associated with the wastes produced by the Chemetco facility.

SECTION 5.0 MIGRATION PATHWAYS

SECTION 5.1 INTRODUCTION

CERCLA identifies three migration pathways and one exposure pathway by which hazardous substances may pose a threat to human health and/or the environment. Consequently, sites are evaluated on their known or potential impact to these four pathways. The pathways evaluated are groundwater migration, surface water migration, air migration and soil exposure. The following section discusses these pathways and the site's impact or potential impact on them and on the various human and environmental targets. These targets include human populations, fisheries, endangered species, wetlands and other sensitive environments.

SECTION 5.2 GROUNDWATER PATHWAY

The local geology and hydrology have been studied extensively for Chemetco by environmental consultants. The information in this section is drawn from studies prepared by CSD Environmental Services (Ref. 13) for Chemetco and submitted to the agency.

Chemetco has numerous monitoring wells located throughout their property. In the May 2002, six of these monitoring wells were sampled and their results were compared to Illinois EPA groundwater standards (35 IAC 620 Groundwater Standards). Samples from the wells were found to exceed the standards for inorganics: arsenic, boron, cadmium, copper, fluoride, iron, lead, manganese, nickel, selenium and zinc. Samples from these wells also detected cis 1,2-dichloroethylene, methyl tert-butyl ether, trichloroethylene, xylene, phenol, 2-chlorophenol, 2-methylphenol, 4-methylphenol and 2,4,6-trichlorophenol. During the 2008 ESI, the monitoring wells sampled revealed elevated levels of inorganics which can be attributed to the slag and zinc oxide piles located onsite. These piles are unlined and surface water is allowed to infiltrate the slag material and eventually enter into the groundwater at the site by percolation.

The City of Roxana has potable wells that are within four miles of Chemetco facility which utilize groundwater for their municipal water supplies (see Figure 10 for the locations of these wells). These wells obtain water from approximately 100 feet in depth from a sand and gravel aquifer. According to the Illinois EPA 2006 Annual Compliance Report, which tells whether public wells are in compliance with drinking water Maximum Contaminant Levels (MCL), none of the wells exceed MCLs for any contaminants that would be associated with the Chemetco site.

Several of the rural residences in the vicinity of Chemetco also utilize private wells for

their water supply. Four of these residential wells were sampled to help determine whether activities at Chemetco have impacted their water supply. These wells ranged from forty to fifty feet in depth. The locations of the residential wells that were samples can be seen on Figure 7.

The analytical results from the residential wells were compared to current US EPA drinking water standards. The drinking water standards that are used for comparison values are called Maximum Contaminant Levels, or MCLs. MCLs are the highest levels of a contaminant that is allowed in drinking water for public water systems. Although the residential wells that were sampled are not considered public water systems, the MCLs can still be used as a health-based comparison value. When compared to the MCLs, none of the residential wells were found to contain any contaminants exceeding these levels.

SECTION 5.3 SURFACE WATER PATHWAY

There are at least three different overland flow segments for the surface water pathway. Each pathway will be discussed.

The first overland flow segment begins at the zinc oxide pile. Surface water flowing from the zinc oxide pile would flow south. A portion of the water would flow to the southeast to the cooling canals. Water draining from the western portion of the site would flow south along the west side of the dome building. Water would then flow southwest across the asphalted surface of the Chemetco facility to the north side of the commercial offices, where the water was approximately 6 inches deep. The surface water would then continue to flow to the west to the ditch located on the west side of the facility. This overland flow/flood draining from the

Chemetco facility was witnessed during a reconnaissance visit on April 1, 2008 (Ref. 25). During the reconnaissance inspection on April 1, 2008, photos were taken of surface water leaving the site from the west side of the Chemetco facility (Ref. 25, p. 1). Water from the west side of the facility was flowing adjacent to the railroad tracks in a ditch (Ref. 25, p. 1-3). This ditch flowed south 0.16 miles (Ref. 37, p. 3) and was directed to a culvert which went under the railroad tracks and Chemetco Lane (Ref. 25, p. 3-4). The water then continued to flow south along the roadside ditch of Illinois Highway Route 3 (Ref. 25, p.3-4) for 0.22 miles where the surface water reaches another culvert which directs the runoff Long Lake (Ref. 7, Ref. 25, p. 5-6). This location would be the PPE1 due to the presence of Long Lake and adjacent wetlands (Ref. 6, Ref. 1, Sec. 4.0.2). This overland flow segment and PPE1 is depicted in Fig 5.

Surface water draining from the truck parking area located southwest of the fenced Chemetco facility empties into adjacent wetlands located at the southwest corner of the truck parking area (Ref. 25, p. 4 – 5). PPE 2 is designated in Figure 4.

The third overland flow route begins with surface water drainage from the smaller slag piles located to the south of the cooling lagoons draining south to the concrete lined ditch and then continue east to the holding basin. The holding basin was seen to be overflowing during the reconnaissance and during the ESI. The overflowing water from the holding basin (Ref. 25, p. 14 - 15) was flowing south down the embankment into the tall grasses and phragmites (Ref. 25, p. 16). This surface water pathway became difficult to discern with the abundance of water in the area and the pathway through the abundant grasses and phragmites. This overland flow segment and PPE3 is depicted in Fig. 4.

Surface water runoff from Chemetco flows into Long Lake which is located just south of the facility (see Figure 6). At the time of the sampling event in May of 2008, the lake was shallow with most areas being less than two feet in depth. A portion of Long Lake is located alongside a residential neighborhood (see Figure 6). Some people in this neighborhood indicated that they utilize the lake for recreational fishing. In addition, forested and emergent wetlands are located adjacent to the tributary of Long Lake and Long Lake along the majority of their shorelines downstream of Chemetco.

PPE1 was used to calculate the target distance limit. Beginning at the southern end of Long Lake, the water flows to the west into Stanley Ditch which flows in a southwesterly direction. At this point the surface water could flow two different directions. Surface water could flow to the west to the Chouteau Slough (.32 miles) or continue flowing south through a marshy area which is approximately 1.5 miles long and ending in this area. If the water is to flow to the Chouteau Slough, through the slough (0.57 miles) and to the overflow of the slough on the southern side of the slough, water would then flow 4.43 miles down an intermittent stream through a series of drainage ways to a finger off of the Chain of Rocks Canal. Water would then flow to the west to the Chain of Rocks Canal (.23 miles). Once entering into the Chain of Rocks Canal, the water then flows for 0.79 miles to the Mississippi River. Once entering into the Mississippi River, the water then flows for an additional 2.72 miles to the terminus of the 15-mile target distance limit (TDL), near Brooklyn, Illinois (Figure 9).

Twenty-four sediment samples were collected from Long Lake in May of 2008 to help determine whether contaminants have migrated from the Chemetco site into the lake. These were all collected within the top six inches of the soft sediment bottom of the lake and analyzed

for inorganics. The locations of the sediment samples can be seen on Figure 5.

The analytical results from the sediment samples were compared to background concentrations in order to determine whether Long Lake has been impacted by Chemetco.

The HRS uses the following definition of wetlands (40 CRF 230.3): *Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.* State designated wetlands are present along Long Lake (National Inventory of Wetlands Maps, Wood River IL quadrangle, 1988). These wetlands are located all along Long Lake and can be viewed in Figure 6. The wetlands are designated by the state as designated natural areas. These wetlands extend all the way to the canal (3.65 miles, Arcview 9.3). The wetlands found along Long Lake consist of Palustrine Emergent, Palustrine Forested, Palustrine Scrub-Shrub and Palustrine Unconsolidated Bottom. All of these types of wetlands except Unconsolidated Bottom are presumed to meet the 20 CFR 230.3 definition of a wetland. The Unconsolidated Bottom wetland may meet the 40 CFR 230.3 of a wetland if emergent hydrophytes are present. Photos taken of sample locations show emergent hydrophytes, cattails and lily pads at sample locations SD02 through SD05.

From interviews with individuals living near Long Lake, in the past the Long Lake was used for fishing. If there are still individuals fishing the lake it is limited.

According to the Illinois Department of Natural Resources, there is no known endangered species occupying or utilizing Long Lake.

Long Lake may be used for occasional recreation purposes. Many wooden docks extend into the Lake from many backyards. Long Lake may be used for canoeing or boating purposes.

As can be seen on Table 4, the sediment samples collected from the tributary of Long Lake and Long Lake meet observed release criteria according to the Hazard Ranking System (HRS) for aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, sodium, thallium and zinc. These are all metals which were present at significantly elevated levels in the sources located onsite, the zinc oxide and slag piles. Thus, the elevated levels of these metals can be attributed to the Chemetco site. The documented portion of Long Lake that has been impacted extends to the furthest downstream sediment sample that was found to be contaminated which is sample X201 with sodium and mercury. X202 was the furthest sample which exceeded three times the background concentration for silver (see Table 4, Figure 5). X206 was the furthest sample from PPE1 (2.87 miles) which revealed elevated levels of cadmium (Table 4, Figure 5).

Potential contamination exists for the remaining wetlands (approximately 10 miles of wetlands) within the 15-mile TDL from X206 for cadmium.

The distances were calculated using Global Information System (GIS) software. The distance was determined based on the locations of the sediment samples as logged into the Global Positioning Unit upon the time of collection, and then transferred to the GIS program. These locations were then placed on the digitized and rectified aerial photograph of the area. Then using this program, the ruler option of the program allows users to find distances. Sample locations are depicted in Figure 5.

SECTION 5.4 SOIL EXPOSURE

For many years of its operations, Chemetco discharged metals out of its smelting furnace

smoke stacks without adequate air pollution emission controls. In addition, the slag on-site blows around on dry, windy days and could migrate off site to residential areas. During the 2008 CERCLA ESI sampling event, the Illinois EPA sampled the soils in three yards in the vicinity of Chemetco with an X-ray Fluorescence analyzer for inorganics. Houses were selected in all directions of the facility to determine whether past activities at Chemetco had impacted nearby residences. In addition, XRF samples were collected to help determine whether flooding of Long Lake had deposited contaminants onto the yards alongside Long Lake. The locations of the residential soil samples can be seen on Figures 11-13.

The XRF results of the residential soil samples were compared to Illinois EPA's Tiered Approach to Correction Action Objectives human health-based remediation objectives for residential properties and are shown in Table 8. When compared to these remediation objectives, none of the soil samples collected from the residential yards was found to contain any contaminants exceeding these objectives.

Residential population surrounding the site was calculated using GIS software and data collected from the U.S. Census Bureau of the 2000 Census (Ref. 23).

Distance from Facility	Population
0-1/4 mile	4
¼ -1/2 mile	10
½ mile to 1 mile	27
1-2 miles	1036
2-3 miles	5976

3-4 miles	6339
Total Population	13,392

Soil samples were also collected in the surface soils to the south of Chemetco in the area of the acid spill area. The acid spill area was devoid of vegetation. Groundwater and surface water are allowed to flow through the acid spill area and make their way to the tributary of Long Lake.

Two samples were collected from the west of the site in an undisturbed area. Soil sample media was similar in nature being brown silt to brown silty clay. All samples were collected within the 0 – 6 inches from the surface of the soil. Sample descriptions are located in Table 1. Sample locations can be found in Figure 3.

Upon comparison to background concentrations, nickel and sodium exceeded three times the background levels for soil samples X101-X106. Copper exceeded three times the background levels for soil samples X101, X103-X106. Soil sample X105 revealed beryllium, cadmium, calcium, cobalt, lead, manganese, silver, and zinc as well as copper, nickel and sodium significantly above background concentrations (Table 2).

SECTION 5.5 AIR PATHWAY

The potential for windblown particulates to carry contamination off-site exists. The Chemetco facility is not vegetated and contains exposed slag and zinc oxide piles which contain high levels of metals. On dry, windy days small particles are blown off of these piles and could potentially be blown onto nearby residential properties. However, there are very few residences

in the immediate vicinity of Chemetco and the soil samples collected from these yards during the April 2002 and on the May 2008 sampling event did not show levels of contamination exceeding health-based benchmarks.

A group of people who could be potentially exposed to elevated levels of airborne contaminants are the onsite workers. The levels of lead found in the slag pile range from around 8,190 to 27,900 parts per million and in the zinc oxide pile lead was found at concentrations of up to 139,000 parts per million. These greatly exceed health-based benchmarks for lead which are 400 parts per million. When particulates from these materials blow around the site the workers could potentially inhale or ingest them. Because of this, measures should be taken to reduce the occurrence of the contaminants from becoming airborne and during times when the contaminants are airborne the workers should wear respiratory protection to reduce their intake of contaminants.

Residential population surrounding the site was calculated using GIS software and data collected from the U.S. Census Bureau of the 2000 Census (Ref. 23).

Distance from Facility	Population
0-1/4 mile	4
¼ -1/2 mile	10
½ mile to 1 mile	27
1-2 miles	1036
2-3 miles	5976
3-4 miles	6339

Total Population	13,392

SECTION 6.0 SUMMARY

The purpose of the Expanded Site Inspection was to determine if contamination still existed at the facility and to determine if remediation objectives were being pursued. Upon completion of the ESI it was determined that contamination still exists at the property and that the contamination is still impacting the wetlands and Long Lake to the south of the site. Remediation activities at the facility are not being completed nor are they currently being pursued.

In the past Resource Conservation and Recovery Act (RCRA) was conducting inspections of the site and attempting to regulate the activities at the facility. Due to bankruptcy proceedings, Chemetco is no longer being addressed through the RCRA program. Since the RCRA program is no longer applicable, Chemetco was unarchived from CERCLIS.

The Illinois EPA has discussed options on how to address the contamination of the site. Upon completion of these discussions it was suggested that the site continue in the CERCLA process.

Inorganics from past processes have been found in the surface water pathway. Contaminants have migrated from the site to the adjacent Long Lake. Wetlands are located along both sides Long Lake for approximately 3.8 miles (National Wetlands Inventory Map of Wood River Quadrangle, 1988). Inorganic levels exceed three times the background concentration for aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, copper,

iron, manganese, mercury, nickel, selenium, silver, sodium, thallium, and zinc (Table 4).

The groundwater pathway remains a concern even though very few contaminants were found in the groundwater. Local residents in the area obtain drinking water from the shallow aquifer. In the future, local residents may find contamination in their drinking water wells. There are also two residential community wells located within four miles of the facility. These wells are located up-gradient from the facility, but the possibility remains that they could potentially become contaminated in the future. Especially due to excessive pumping that could possibly pull the water out of the natural gradient.

The air migration pathway could potentially blow contaminated slag material away from the site. Possible human exposure to airborne slag has not been documented nor has elevated levels of inorganics been found in adjacent residential yards. At this time, the Chemetco facility is utilizing water sprayers to suppress the slag material in order to prevent any airborne migration.

Although the site is fenced, four workers are present at the site, as well as contractors and visiting personnel. There has also been evidence of trespassers in the past. Soil exposure to these individuals is a possibility.

SECTION 7.0 REFERENCES

1 Illinois Environmental Protection Agency, Annual Compliance Report for Public Drinking Water Supplies, August 2007.

2 Illinois Environmental Protection Agency, Bureau of Land Files, Chemetco, LPC 1198010003.

3 Grimley, David A, and Scott W. Lepley, Illinois Department of Natural Resources, Illinois State Geological Survey, Surface Geology of Wood River Quadrangle, 2005.

4 Techlaw, Inc. Chemetco: Material Quantities Report by Supplier and Date, March 12, 2008.

5 United States Department of the Interior, National Wetlands Inventory Map of the Wood River Quadrangle, 1988.

6 United States Department of the Interior. National Wetlands Inventory Map of the Wood River Quadrangle. 1988.

7 United States Department of the Interior Geological Survey, Topographical Map of the Wood River Quadrangle, 1955, 1968 and 1974.

8 United States Department of the Interior Geological Survey, Topographical Map of the Granite City Quadrangle, 1954, 1982.

9 United States Department of the Interior Geological Survey, Topographical Map of the Monks Mound Quadrangle, 1954, 1993.

10 United States Department of the Interior Geological Survey, Topographical Map of the Columbia Bottom Quadrangle, 1951, 1968, 1974, 1979.

11 Grimley, David A. and Andrew C. Phillips. Map of the Surficial Geology of Madison County, Illinois. 2006.

12 United States Department of Agriculture, Soil Survey of Madison County, Illinois. 1999.

13 CSD Environmental Services, Inc. Chemetco Incorporated, 1198010003-Madison County, Zinc Oxide Spill Remediation Plan, April 1997.

14 Site Investigation Plan, Chemetco, Incorporated. Tasks I, II, and IV. June 1987.

15 Smith, Phillip A. Ecology and Environment, Inc. Final Report for Chemetco, Inc.

September 30, 1987.

16 Illinois Department of Natural Resources. Ecological Compliance Assessment Tool (EcoCAT). IDNR Project # 0810468 for 3754 Chemetco Lane, Hartford, Il. March 25, 2008.

17 Hurst-Rosche Engineers, Inc. Volume Surveys and Density Evaluation for Chemetco, Inc. Facility. April 17, 2007.

18 Illinois Environmental Protection Agency. Illinois EPA Director Issues Seal Order on Chemetco Property. December 7, 2001. http//www.epa.state.il.us/news-releases/2001/2001-146-chemetco-order.html.

19 ERT, Groundwater Monitoring Plan for Chemetco, Inc. September 1986.

20 Davis, Gary. EH&S, RCRA Closure Plan, Brick Shop Container Storage Area, January 29, 2008.

21 Watson, Robert. Illinois Environmental Protection Agency, Review Notes on Closure Cost Estimates. November 8, 2006.

22 Illinois Environmental Protection Agency. Expanded Site Investigation of Chemetco. September 20, 2002. p. 53.

23 Range, Lance. Memorandum to File. August 25, 2008. p. 3

24 Illinois Environmental Protection Agency. Bureau of Land Sampling Procedures Guidance Manual. September 1996.

25 Illinois Environmental Protection Agency. Photo Reconnaissance, April 1, 2008. p. 23.

Appendix A
Figures and Maps

Figure 1
Site Location

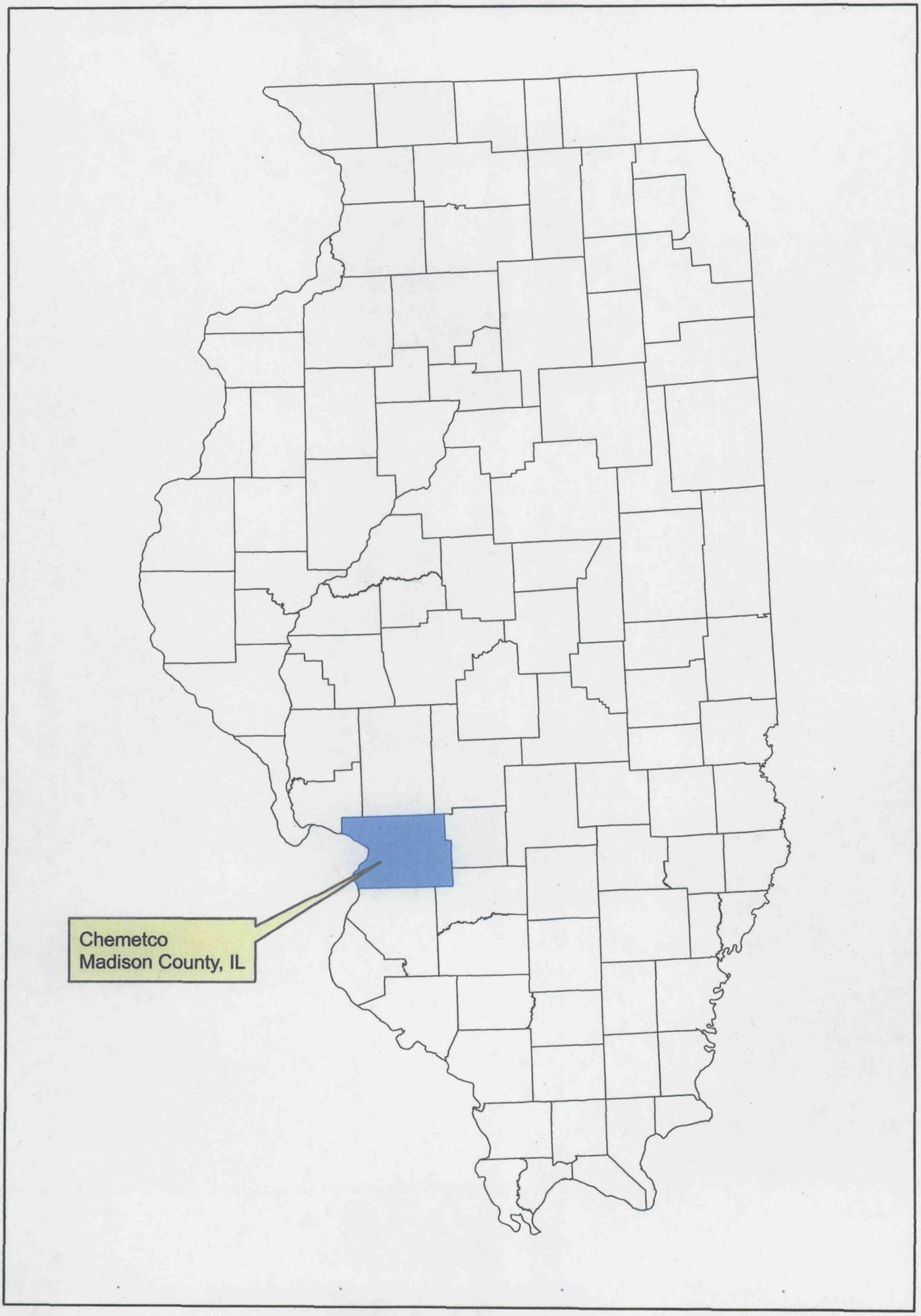


Figure 2 Site Area Map

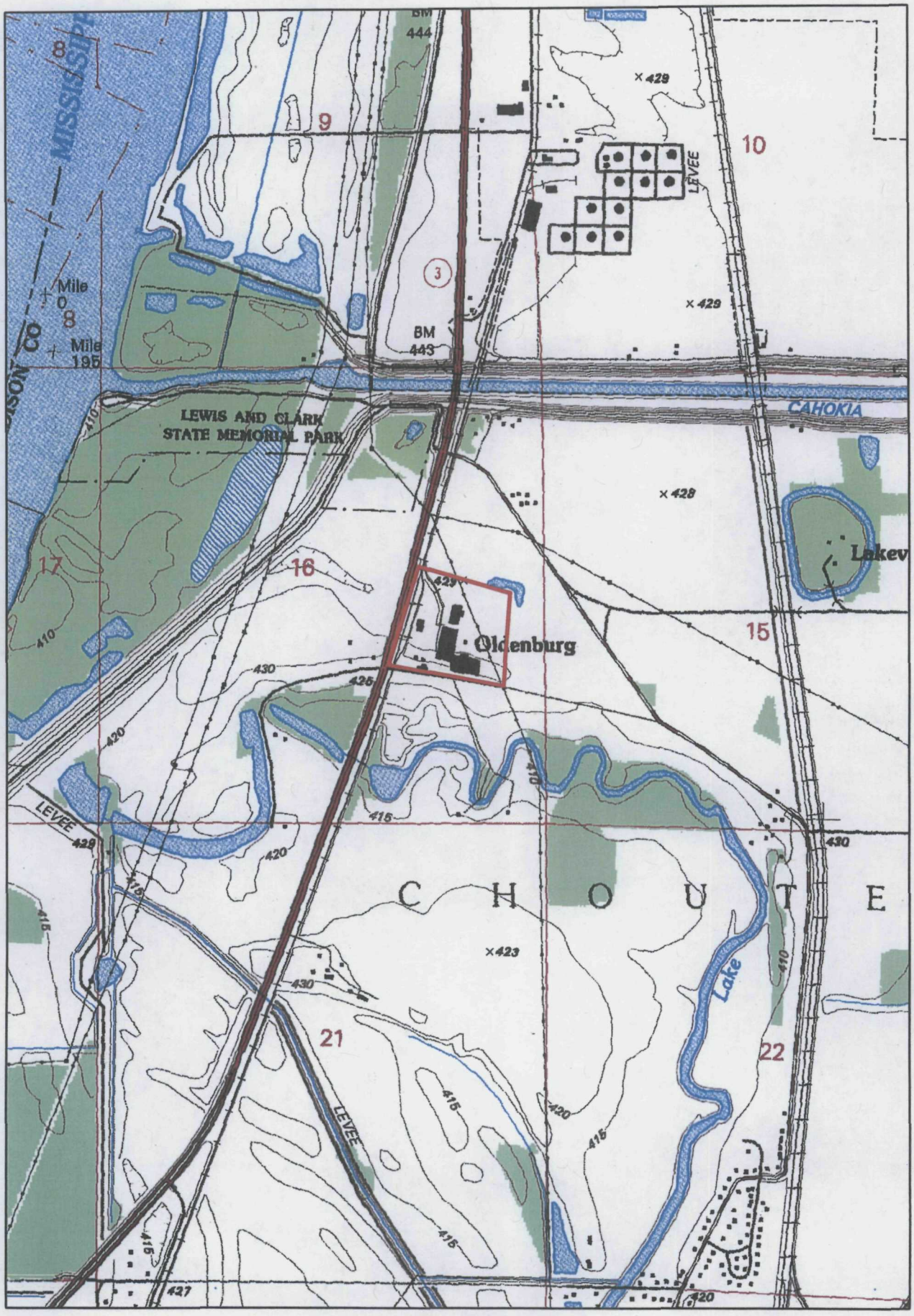


Figure 3
Soil Sample Locations

Figure 4
Waste Sample Locations

Figure 5
Sediment Sample Locations

Figure 6
Monitoring Well Sample Locations

Figure 7
Residential Well Sample Locations

Figure 9
15 Mile Surface Water Map

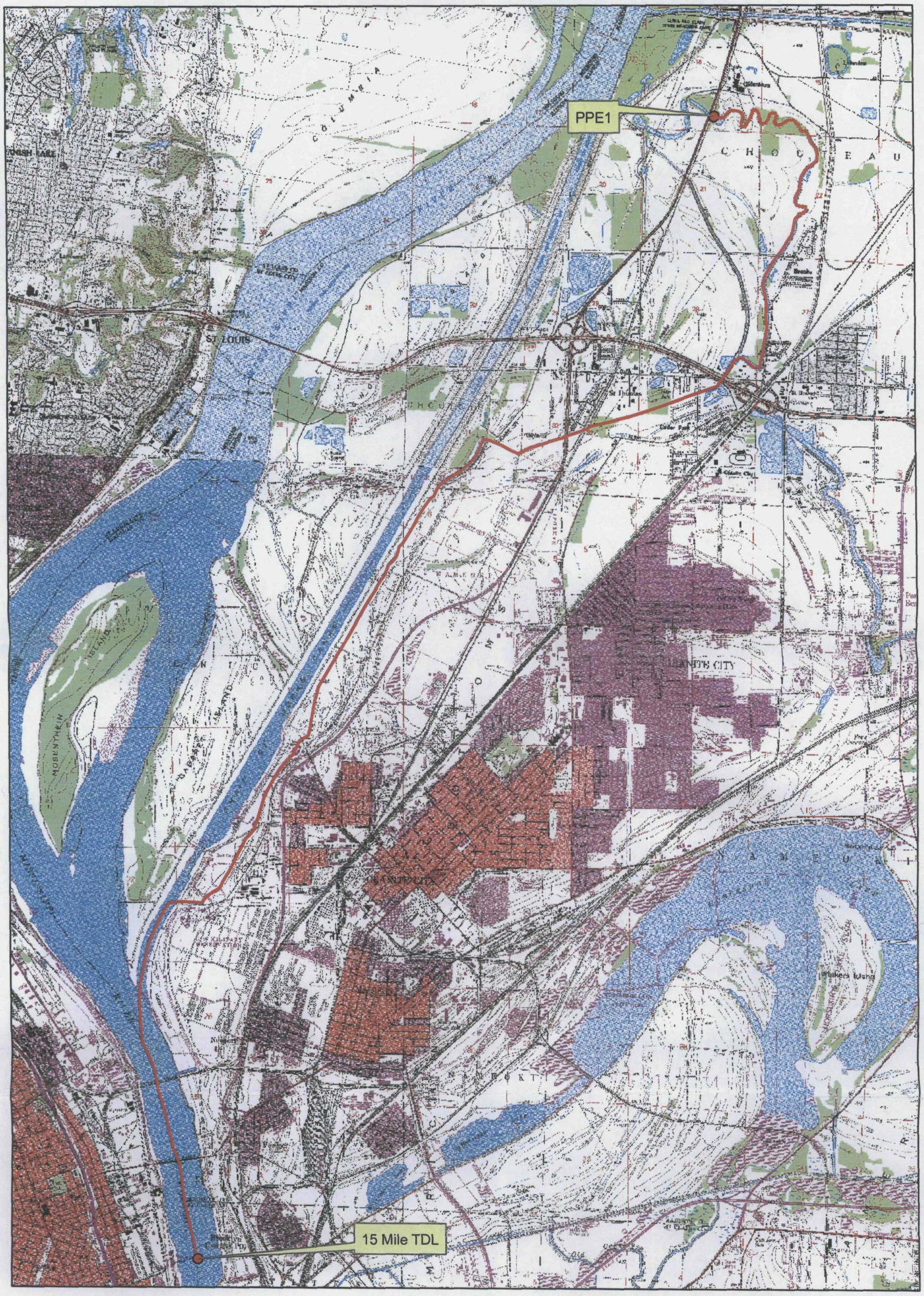


Figure 10
4 Mile Radius Map

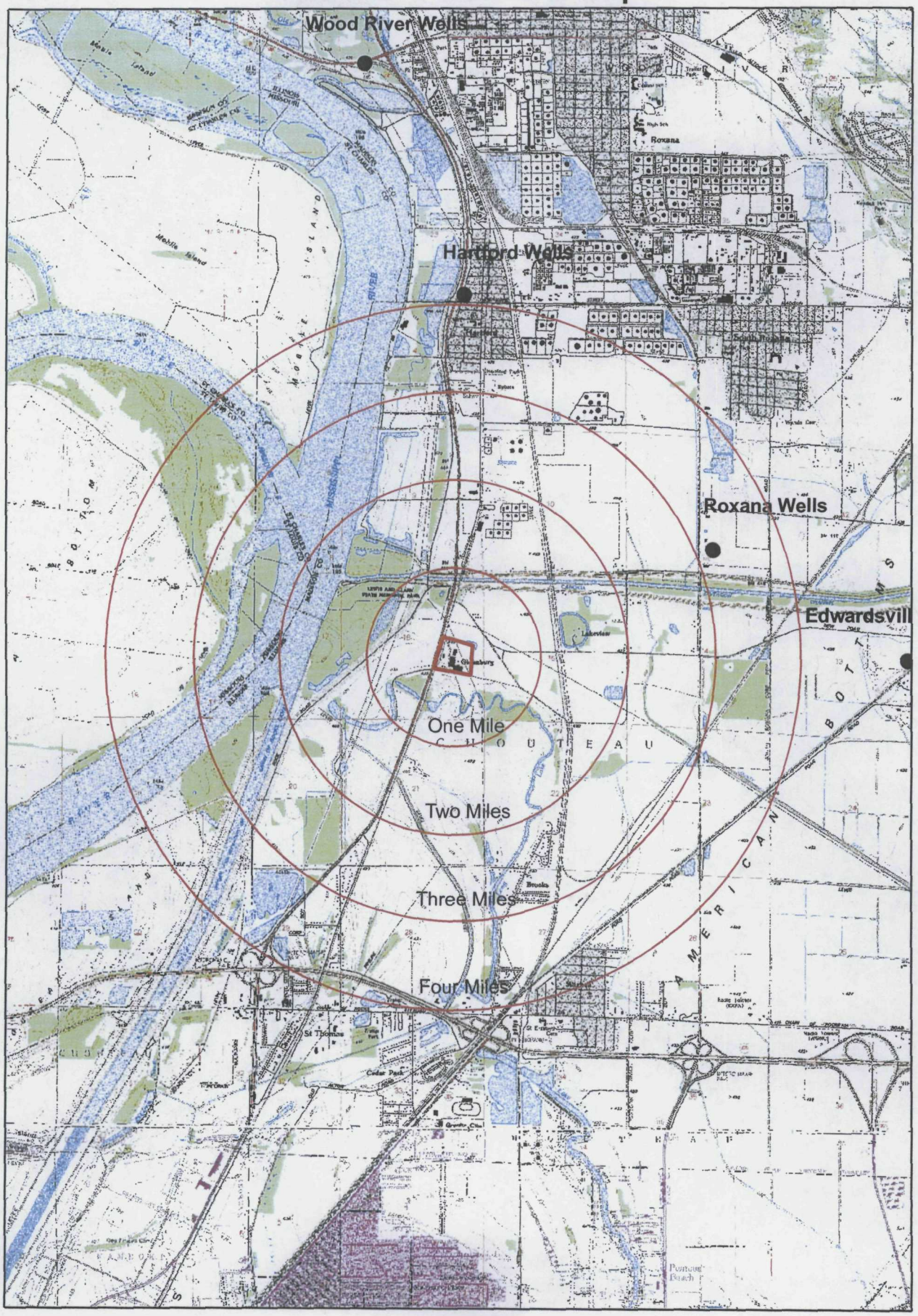


Figure 11
XRF Sample Locations

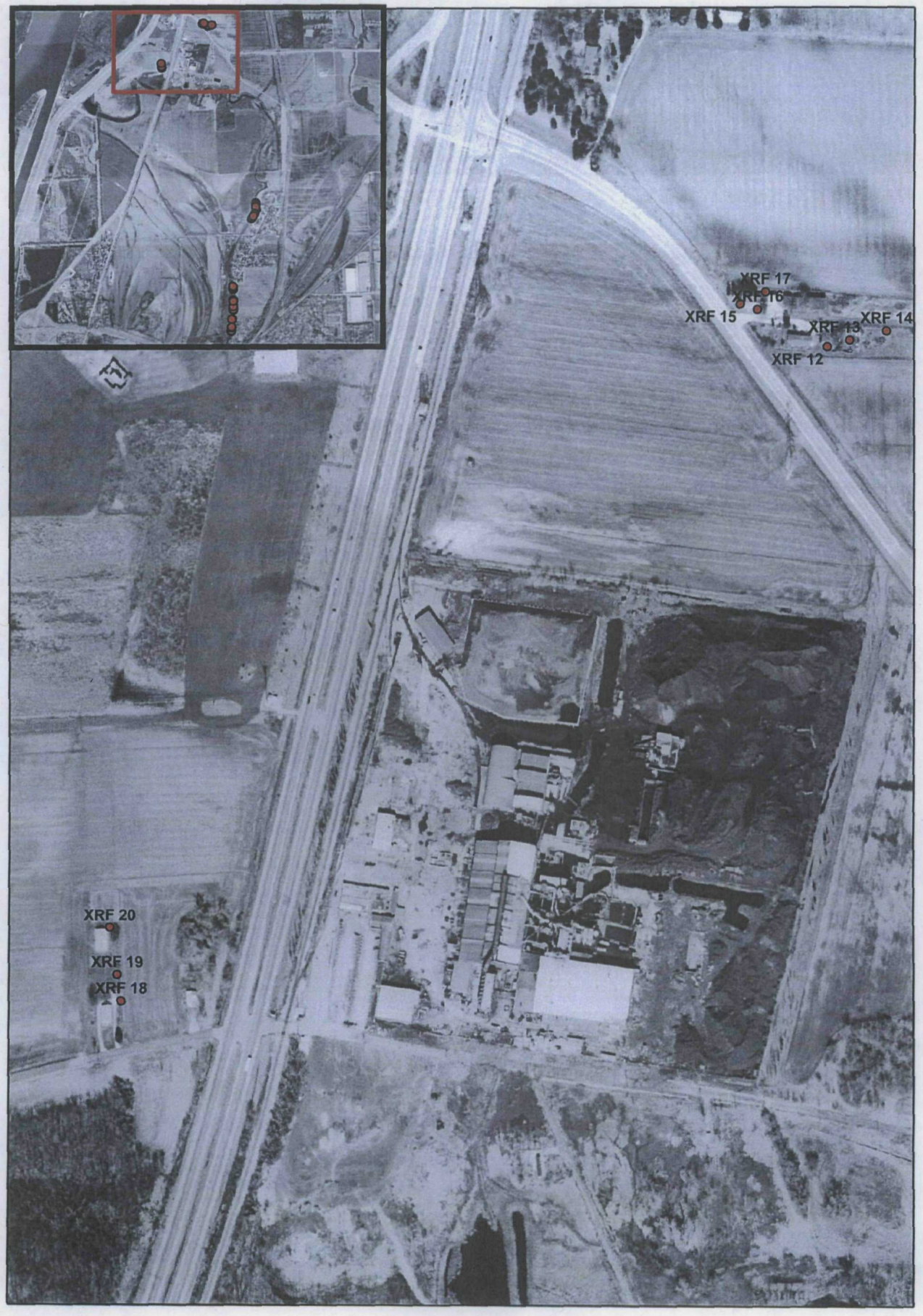


Figure 12
XRF Sample Locations

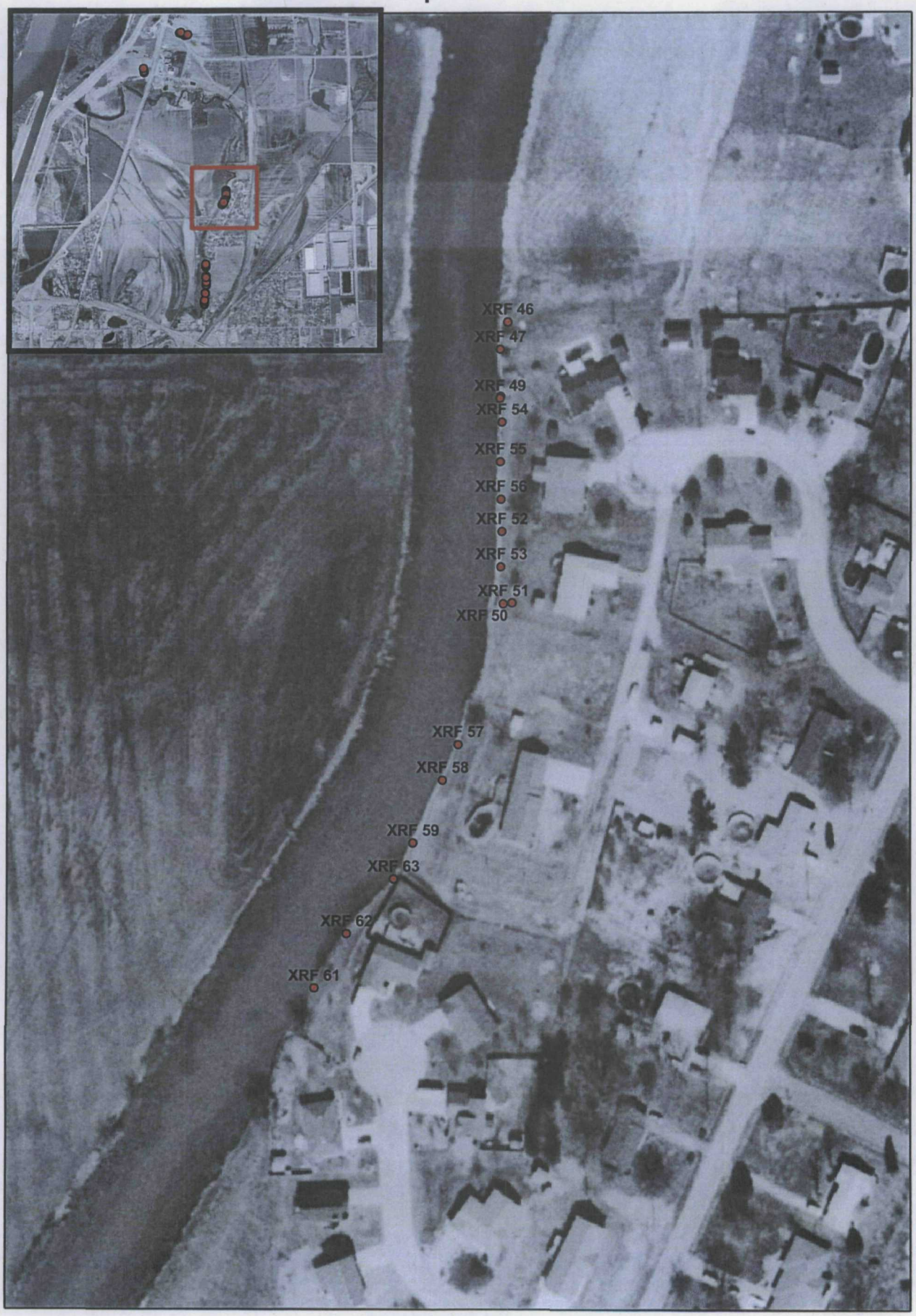


Figure 13
XRF Sample Locations

Fig 14 Chemetco Facility Map

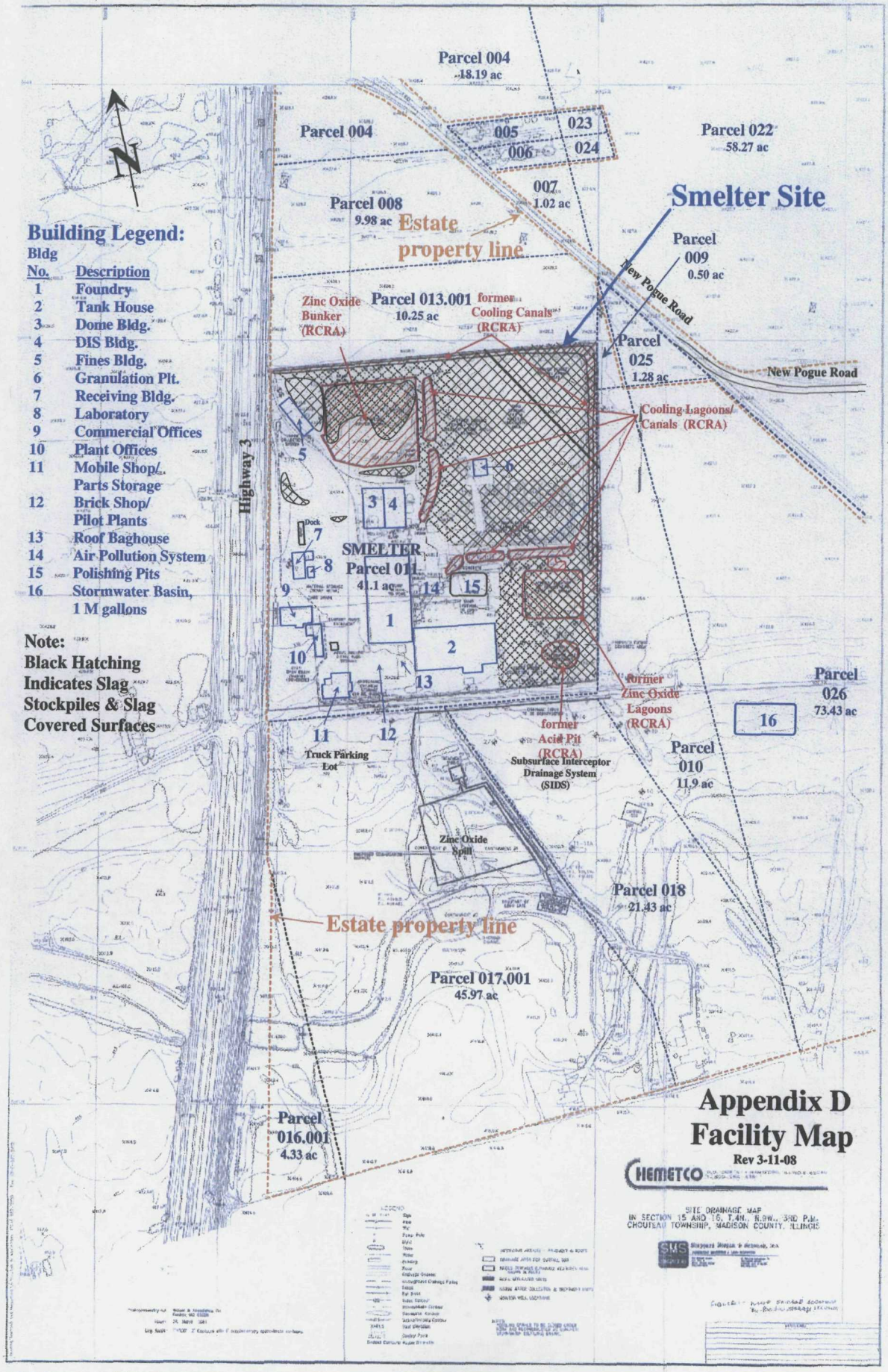
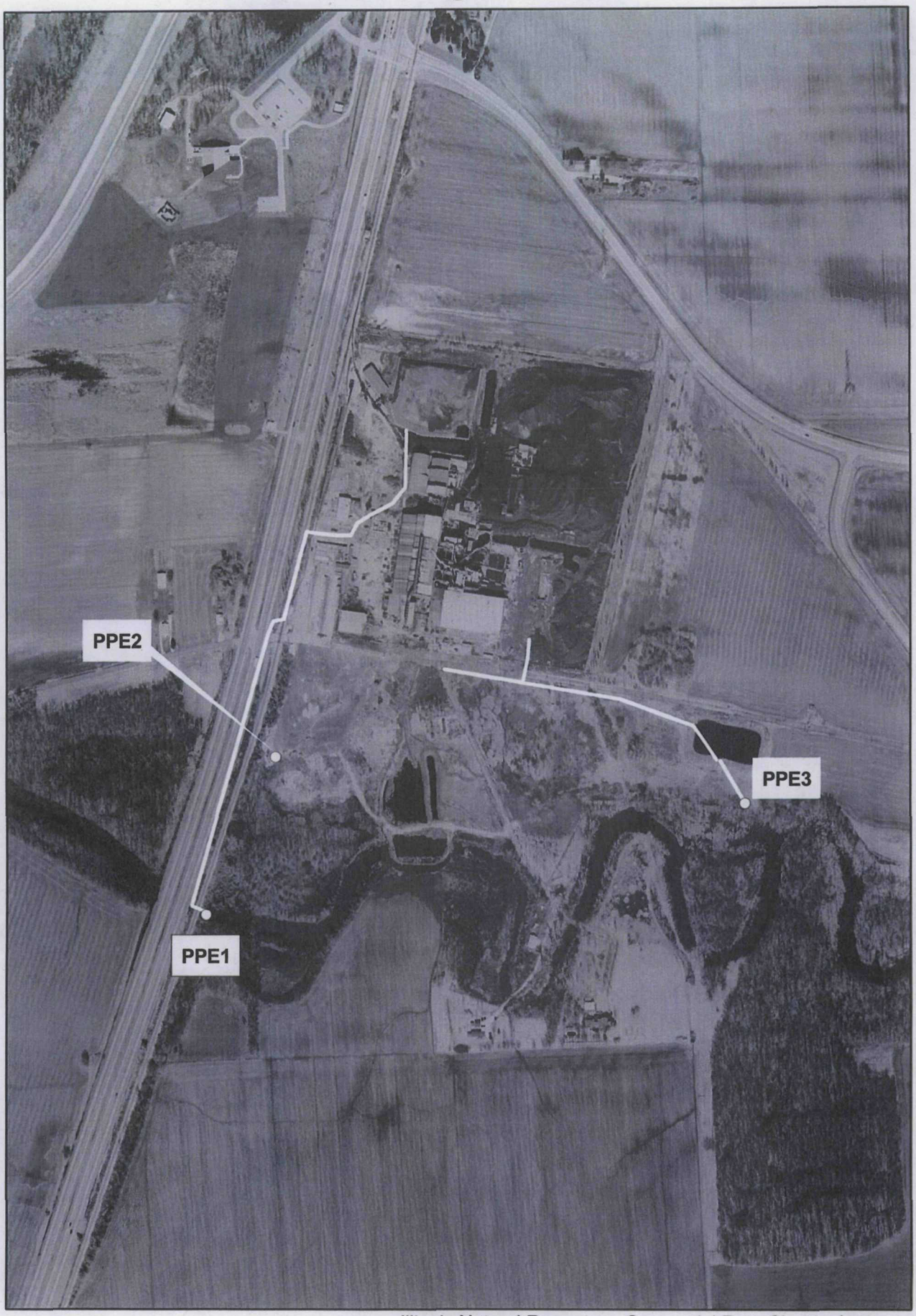


Figure 15
Overland Flow Segments and PPEs



0 0.0350.07 0.14 0.21 0.28 Miles

N

Illinois Natural Resources Geospatial Data Clearinghouse, Illinois State Geological Survey, http://www.isgs.uiuc.edu/nsdihome/ (2005 DOQ Data, Madison County, Wood River Quadrangle, SW Quadrant, UTM; accessed September 10, 2008).

Appendix B
Tables

TABLE 1
Sample Descriptions

Sample	SD#	Location	Depth	Description
X201	SD1	Long Lake at the southern end near the Township building.	0-4 inches	X201 consisted of a gray clay. Sample was collected from the middle of the lake channel from 2 ft of water. Collected on 5/5/08.
X202	SD2	Long Lake at the southern end near the Township building.	0-4 inches	X202 consisted of a brown silty clay. Sample was collected from middle of the lake channel from 2 ft of water.
X203	SD3	Collected from Long Lake near southern residences	0-4 inches	X203 consisted of a silt and clay mix with some small bits of gray gravel and some vegetation. Sample was collected form the middle of the lake channel from 2 fet of water.
X204	SD4	Collected from Long Lake slightly south of a four house section along the lake.	0-4 inches	X204 consisted of a silty brown clay. Sample was collected from the middle of the lake channel from 2 ft of water.
X205	SD5	Collected from Long Lake slightly north of a four house section along the lake.	0-4 inches	X205 consisted of a clay with a small amount of silt which was slightly stiff and brown. Sample was collected from the middle of the lake channel from 3 ft of water.
X206	SD6	Collected from Long Lake just south of Franko Lane	0-4 inches	X206 consisted of a gray brown clay mixed with some organic material. Sample was collected from the middle of the lake channel from 3 ft of water.
X207	SD7	Collected from the channel linking the canal with Long Lake at Franko Lane	0-4 inches	X207 consisted of a still mottled brown clay with a small amount of silt and gravel. Sample was collected from the middle of this channel linking Long Lake with the canal in 2.5 ft of water.
X208	SD8	Collected from the channel linking the canal with Long Lake at Franko Lane	0-4 inches	X208 consisted of a clayey silt which was gray brown in color. Sample was collected from the middle of the channel linking Long Lake with the canal in 2 ft of water.
X209	SD9	Collected north of Franko Lane near some residences	0-4 inches	X209 consisted of a loose sitly clay with organic matter which was black/gray in color. Sample was collected near the east side of the lake channel in 1.5 ft of water.
X210	SD10	Collected just north of the residences in the small subdivision	0-4 inches	X210 consisted of a dark brown silty clay with a high amount of silt. Sample was collected from the middle of the lake channel in 3 ft of water.
X211	SD11	Collected just north of the residences in the small subdivision	0-4 inches	X210 consisted of a dark brown silty clay with a high amount of silt. Sample was collected from the middle of the lake channel in 3 ft of water. Duplicate of X210.
X212	SD12	Collected from the bend in Long Lake just north of the residential area	0-4 inches	X212 consisted of silty clay which was grayish brown. Sample was collected from the middle of the lake channel in 2 ft of water.
X213	SD13	Collected from Long Lake just north of an unnamed farm road which crosses Long Lake. Collection was just to the south of a significant decreasing of the lake size.	0-4 inches	X213 consisted of a brownish gray silty clay with vegetative matter. Sample was collected from the middle of the lake channel in 1 ft of water.
X214	SD14	Collected from Long Lake just south of the former east entrance to the Chemetco facility.	0-4 inches	X214 consisted of a silty material with with no clay which was dark brown in color. Sample was collected from the northern edge of the Lake in 1.5 ft of water. Collected on 5/5/08. Approx 6490 ft from PPE.
X215	SD15	Collected from Long Lake east of the road crossing the Lake to the large house to the south.	0-4 inches	X215 consisted of a brown silty clay. Sample was collected from the western edge of the lake in 1 ft of water. Collected on 5/6/08. Approx. 3928 ft from PPE.

TABLE 1
Sample Descriptions

Sample	SD#	Location	Depth	Description
X216	SD16	Collected from the NE portion of Long Lake in the suspected area in which the overflow from the retention pond enters Long Lake	0-4 inches	X216 consisted of a very sitly clay from the NW edge of Long Lake in the area of confuence with the runoff from the retention pond. Sample was collected on the NW edge in approximately 1 ft of water. Collected on 5/6/08. Approximately 4846 ft from PPE.
X217	SD17	Collected from the overflow from the retention pond	0-4 inches	X217 consisted of a gray clay. Sample was collected from the area in which retention water was overflowing the retention pond.
X218	SD18	Collected from the outflow from the storm water pipe to the retention pond.	0-4 inches	X218 consisted of a silty gray clay. Sample was collected from the outflow from the pipe which then flows to the retention pond.
X219	SD19	Collected from Long Lake in the area north of the two homes located on Chemetco property.	0-4 inches	X219 consisted of a medium brown to black organic silty clay. Sample was collected from the middle of the lake channel in approximately 2 ft of water. Collected on 5/6/08, approximately 1735 ft from PPE
X220	SD20	Collected from Long Lake near the area where the new channel was cut around an old retention pond and at the probable confluence with drainage from the truck parking area.	0-4 inches	X220 consisted of a greenish brown soft clay with a small bit of vegetation. Sample was collected near the north portion of the lake where the probable entry of contaminants filtering from the truck parking area may be entering Long Lake. Sample was collected in 2 ft of water. Collected on 5/6/08, approx. 1040 ft from PPE.
X221	SD21	Collected from upgradient of the probable entry of contaminants into Long Lake.	0-4 inches	X221 consisted of a blak silt with some clay. Sample was collected from the middle of the lake channel in approximately 5 ft of water. Collected on 5/6/08, approximately 512 ft from PPE.
X222	SD22	Collected from the western portion of Long Lake approximately 50 yards east of the railroad tracks.	0-4 inches	X222 was collected from and area closer to the southern bank of Long Lake. Sample consisted of a black silty clay with organic material. Sample was collected from 2 ft of water. Collected on 5/6/08 approximately 239 ft from PPE.
X223	SD24	Collected from the probable confluence of the water drainining from the zinc oxide spill area into Long Lake	0-6 inches	X223 consisted of a brown silty clay. Sample was collected near the NW edge of Long Lake at the approximate confluence with drainage from the zinc oxide spill area. Collected on
X224	NA	Collected from the Long Lake area to the west of Route 3.	0-6 inches	X224 consisted of a silty clay mix which was brownish gray in color. Sample was collected from the northern portion of Long Lake in approximately 1 ft of water.
X101	SD23	Collected from the Zinc Spill Area	0-6 inches	X101 consisted of a light colored greenish material intermixed with dark brown sandy silt.
X102	SD25	Collected from the southern portion of the Zinc Spill Area	0-6 inches	X102 consisted of a dark brown silty sand with no clay material. Fan out area of the zinc spill.
X103	SD26	Collected from the Zinc Spill Area	0-6 inches	Collected from a silty soil which was loose (fluffy).
X104	SD27	Collected from a gully in the Zinc Spill Area	0-6 inches	X104 was collected from a silty soil with a green scaley flakes on top. Collected from a gulley.
X105	NA	Collected from the west side of the zinc oxide spill area	0-2 inches	X105 consisted of a light brown silty material. This sample was collected from the western portion of the zinc oxide spill area.
X106	NA	Collected from the zinc oxide spill area from a gully.	0-2 inches	X106 consisted of a light brown silt with green scum/material. This sample was collected from a small gully leading from the zinc oxide spill area to the south of Chemetco.
X107	NA	Collected from the west of Route 3 in the wooded area.	0-6 inches	X107 consisted of a light brown silty soil. This sample was collected in the woods which are located west of the Chemetco facility.

TABLE 1
Sample Descriptions

Sample	SD#	Location	Depth	Description
X108	NA	Collected from the west of Route 3 on the edge of the field and west of the wooded area	0-6 inches	X108 consisted of a brown silty clay. This sample was collected at the edge of the field in an area of grass but outside the wooded area.
X301	NA	Collected from the northwestern portion of the slag parking lot area.	0-3 inches	X301 consisted of a black cindery gravel mix from the slag parking lot area.
X302	NA	Collected form the southwestern poriton of the slag parking lot area.	0-1 inch	X302 consisted of a fine silty sandy material with some metal pieces. No cinders in this sample.
X303	NA	Collected from the zinc oxide pile (scrubber sludge)	5-6 inches	X303 consisted of a dark brown grayish material.
X304	NA	Collected from the zinc oxide pile (scrubber sludge)	5-6 inches	X304 was a duplicate of X303. X304 consisted of a dark brown grayish material.
X305	NA	Collected from the east side of the zinc oxide pile (scrubber sludge)	2-4 inches	X305 was collected fromo a dark brown grayish material.
X306	NA	Collected from a slag pile located in the northeastern portion of Chemetco	0-4 inches	X306 was collected from a fine black slag. An onsite employee remarked that this slag was the most recent.
X307	NA	Collected from a slag pile located in the northeastern portion of Chemetco	0-4 inches	X307 was collected from a fine black slag intermixed with large chunks of slag.
X308	NA	Collected from the southern portion of Chemetco from a slag pile	0-2 inches	X308 was collected from a fine gray slag.
X309	NA	Collected from the southern portion of Chemetco from a slag pile	0-2 inches	X309 was collected from a slag pile. Sample consisted of dusty black slag material.
G101	NA	Collected from a residential well located to the north of Chemetco	depth of well 55 ft	G101 was collected from a residential well located to the north of Chemetco. G101 was obtained from an outside spigot but was filtered. Resident mentioned that there was not any access to an unfiltered sample. This well was just recently installed (April 2008).
G102	NA	Collected from a residential well located to the north of Chemetco	depth of well is unknown	G102 was collected from a residential well located to the north of Chemetco. G102 was obtained from an outside spigot and was unfiltered and unsoftened.
G103	NA	Collected from a residential well located to the west of Chemetco	depth of well is 42 ft	G103 was collected from a residential well located to the west of Chemetco. G103 was obtained from an outside spigot and was raw well water. EPA allowed the water to run for only 5 minutes due to the Resident expressing concerns over his well being almost dry.
G104	NA	Collected from a residential well located to the west of Chemetco	depth of well is 42 ft	G104 (dup) was collected from a residential well located to the west of Chemetco. G103 was obtained from an outside spigot and was raw well water. EPA allowed the water to run for only 5 minutes due to the Resident expressing concerns over his well being almost dry.
G201	NA	Collected from MW 41 which can be found east of Chemetco	Depth of well was 21.9 ft	G201 was collected from a monitoring well located to the east of Chemetco. Depth to water from surface was 12.6 ft. Depth of well was 21.9 ft.
G202	NA	Collected from MW 41 which can be found east of Chemetco	Depth of well was 21.9 ft	G202 (dup) was collected from a monitoring well located to the east of Chemetco. Depth to water from surface was 12.6 ft. Depth of well was 21.9 ft.
G203	NA	Collected from MW 16 which is located in the zinc oxide spill area.	Depth of well was 10.2 ft	G203 was collected from MW 16, which is located in the zinc oxide spill area. Depth to water from surface was 1.5 ft. Depth of well was 10.2 ft.

TABLE 1
Sample Descriptions

Sample	SD#	Location	Depth	Description
G204	NA	Collected from MW 47R which is located along the northern boundary of Chemetco	Depth of well was 50.25 ft	G204 was collected from MW 47R, which is located along the northern boundary of Chemetco. Depth to water from the soil surface was 18.05 ft. Depth of well was 50.25 feet.

Table 2
Soil Sample Results

Sample Number :	ME00G0			ME00E4		ME00E5		ME00E6		ME00E7		ME00F8		ME00F9		ME00G1	
Sampling Location :	X107		3	X101		X102		X103		X104		X105		X106		X108	
Matrix :	Soil		times	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units :	mg/Kg		background	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	5/7/2008			5/6/2008		5/6/2008		5/6/2008		5/6/2008		5/6/2008		5/6/2008		5/7/2008	
Time Sampled :																	
%Solids :	66.7			81.8		79.8		72.8		78.9		77.6		73.4		73.2	
Dilution Factor :	1			1		1		1		1		1		1		1	
ANALYTE	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	9480		28440	6900		6520		8780		5850		4330		7110		4990	
ANTIMONY	9.1	UJ	27.3	7.3	UJ	7.4	UJ	7.6	UJ	7.5	UJ	5.6	J	8.2	UJ	8.2	UJ
ARSENIC	9.9	J+	29.7	9.5		12.1		12.8	J+	10.8		22.8		12.1		7.1	
BARIUM	246	J	738	187	J	227	J	210	J	185	J	298	J	213	J	157	J
BERYLLIUM	1		3	0.74		1.1		1.2		1.2		15.1		1.5		0.68	U
CADMIUM	3.1	J	9.3	6.8	J	4.3	J	2.5	J	1.1	J	37.4	J	2.2	J	1.6	J
CALCIUM	9030		27090	4590		2600		4250		6350		29900		4200		4710	
CHROMIUM	15.7		47.1	9.8		10.3		11.9		8.6		13.9		11		8.4	
COBALT	7.8		23.4	36.8		11.7		21.7		8.7		41.9		14.5		6.8	U
COPPER	204	J	612	2070	J	3.1	U	1540	J	2920	J	3690	J	3160	J	75.9	J
IRON	14900		44700	9530		1120		15100		9270		22500		12800		9140	
LEAD	185		555	21.6		354		136		46		2310		184		69.1	
MAGNESIUM	3760		11280	3100		2220		2910		2230		4400		1990		1930	
MANGANESE	577		1731	1400		600		1290		384		2940		682		421	
MERCURY	0.082	J	0.246	0.12	U	0.13	U	0.14	U	0.015	J	0.12	J	0.14	U	0.025	J
NICKEL	28.2		84.6	2390		821		862		818		951		709		15.5	
POTASSIUM	2420		7260	939		1030		1010		803		671		844		1690	
SELENIUM	1.7	J	5.1	0.5	J	0.76	J	0.87	J+	1.1	J	1.8	J	0.91	J	0.71	J
SILVER	1.5	U	4.5	0.74	J-	0.86	J-	0.79	J	0.92	J-	6.3	J+	0.99	U	1.4	U
SODIUM	51.3	J	153.9	619		162	J	245	J	8500		10400		1300		40	J
THALLIUM	1.3	J	3.9	3	U	3.1	U	1.2	J+	0.62	J	1.4	J+	0.94	J	0.58	J
VANADIUM	24.6		73.8	17.9		19.2		26.1		16.6		13.5	J-	21.1		13.6	
ZINC	355		1065	378		509		352		416		15700		367		158	
CYANIDE	3.7	UJ	11.1	3.1	UJ	3.1	UJ	3.4	UJ	3.2	UJ	3.2	UJ	3.4	UJ	3.4	UJ

indicates sample is more than three times background

Table 3
Waste Sa[illegible] Results

Sample Number	ME00G0				ME00E9		ME00F0		ME00F1		ME00F2		ME00F3		ME00F4		ME00F5		ME00F6		ME00F7	
Sampling Locatio	X107 Background				X301		X302		X303		X304		X305		X306		X307		X308		X309	
Matrix :	Soil				Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units :	mg/Kg		3 times	10 times	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	5/7/2008		background	background	5/6/2008		5/6/2008		5/6/2008		5/6/2008		5/6/2008		5/6/2008		5/6/2008		5/6/2008		5/6/2008	
Time Sampled :					parking		Parking		Zn pile		Zn pile		Zn pile		slag pile		slag pile		slag pile		slag pile	
%Solids :	66.7				90.2		79.4		48.5		47.6		64.9		97.8		97.3		96		98.6	
Dilution Factor :	1		3 times	10 times	1		1		1		1		1		1		1		1		1	
ANALYTE	Result	Flag			Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	9480		28440		6450		7800		7790		8190		8460		17800		15800		7250		9550	
ANTIMONY	9.1	UJ	27.3	91	42.1	J	199	J	612	J	636	J	534	J	6.1	UJ	12.3	UJ	6.3	UJ	50.6	J
ARSENIC	9.9	J+	29.7		21.6		31.9		194		206		147		1	J	4.7	J+	7.4		43.3	
BARIUM	246	J	738	2460	718		528		5750		6110		1290		1110		934		507		2190	
BERYLLIUM	1		3	10	18	J	20.9	J	23.1	J	22.3	J	32.2	J	109	J	78.3	J	52.3	J	33	J
CADMIUM	3.1	J	9.3	31	208		234		3500		3660		3180		12		32.2		42.9		441	
CALCIUM	9030		27090		129000		44000		21500		21800		29400		9150		11600		11500		20500	
CHROMIUM	15.7		47.1	157	64.1	J	65.8	J	51.9	J	54.8	J	73.7	J	296	J	180	J	97.8	J	126	J
COBALT	7.8		23.4		51.1		38.1		42.3		43.6		91.8		172		165		135		110	
COPPER	204	J	612	2040	33100		145000		91700		91900		108000		8910		4140		8550		38400	
IRON	14900		44700		66700		49100		19600		20600		29100		251000		248000		183000		186000	
LEAD	185		555		11500		23300		120000		123000		139000		10100		11300		8190		27900	
MAGNESIUM	3760		11280		10300		6300		2880		2980		3360		3920		4060		4000		3900	
MANGANESE	577		1731		1080		1340		944		982		1020		2900		2770		2010		1980	
MERCURY	0.082	J	0.246	0.82	0.78	J+	2.3	J+	27.3	J+	28.9	J+	21	J+	0.1	U	0.098	U	0.12	U	1.2	J+
NICKEL	28.2		84.6		981		1280		3870		3940		6090		975		554		546		1050	
POTASSIUM	2420		7260		589		491	J	257	J	294	J	291	J	1550		1150		597		692	
SELENIUM	1.7	J	5.1	17	4.5	J	5.5	J	29	J	31.1	J	23.3	J	4.8	J	5.1	J	3.8	J	6.3	J
SILVER	1.5	U	4.5	15	28.6	J-	61	J-	80.9	J-	82.6	J-	94.3	J-	9.8	J	7.9	J	9.3	J	37.2	J-
SODIUM	51.3	J	153.9	513	1260		864		529	J	536	J	1160		5690		5910		1830		2410	
THALLIUM	1.3	J	3.9	13	2.8	R	3.1	R	5.5	J	6.4	J	8.3	J-	0.85	J	3.7	J	2.6	R	6.1	J
VANADIUM	24.6		73.8		13.4		6.3	UJ	10.2	UJ	10.5	UJ	8.9		5.1	UJ	5.1	UJ	5.3	UJ	5.1	UJ
ZINC	355		1065		30700		56500		214000		223000		247000		67200		79100		67000		81400	
CYANIDE	3.7	UJ	11.1		2.8	UJ	3.1	UJ	5.2	UJ	5.3	UJ	3.9	UJ	2.6	UJ	2.6	UJ	2.6	UJ	2.5	UJ

indicates that the sample result is at least three times background concentrations

Table 4
Sediment Sample Results

	X224 Background	3 X Background	X201	X202	X203	X204	X205	X206	X207	X208
Aluminum	6900	20700	19500	15700	17100	15100	17600	16900	16000	14300
Antimony	9.4	28.2	9.9	13.4	13	12.1	11.3	12.2	10.5	10.8
Arsenic	5.9	17.7	3.9	10.8	8.8	13	11	7.9	6	6.7
Barium	177	531	285	356	293	346	354	328	240	235
Beryllium	0.88	2.64	1.4	1.2	1.3	1.2	1.3	1.2	1.1	1
Cadmium	6	18.0	0.82	3.6	2.3	3.6	2.4	18.2	9	11.2
Calcium	5200	15600	8550	7820	8520	9040	8730	7710	8360	8750
Chromium	10.9	32.7	24.1	24.1	23.4	22.5	23.8	23.7	22.8	20.7
Cobalt	7.9	23.7	11.2	11.2	10.8	14.9	10	10.1	9.9	9.7
Copper	37	111	30.1	50.2	36.6	41.2	36.9	121	53.4	52.7
Iron	8790	26370	24500	29500	28900	29800	30100	24700	24200	24100
Lead	50.4	151.2	22.7	91.1	46	83.5	61.1	76.3	33.7	33.8
Magnesium	2380	7140	6400	4590	5390	4630	5200	4810	5910	5560
Manganese	245	735	367	708	308	1170	1410	580	423	454
Mercury	0.03	0.09	0.16	0.057	0.22	0.062	0.037	0.075	0.029	0.024
Nickel	18.6	55.8	30.9	40.5	36.4	42.1	27.2	63.3	49.7	44.2
Potassium	1540	4620	3330	2780	2840	2720	3290	3030	2730	2620
Selenium	0.8	2.40	0.86	2.5	1.3	2.4	1.6	1.5	0.73	1.1
Silver	0.64	1.92	1.6	2.2	2.2	2	1.9	2	1.8	1.8
Sodium	217	651	822	1120	1080	1010	943	1010	876	903
Thallium	3.9	11.7	4.1	5.6	5.4	5	4.7	5.1	4.4	4.5
Vanadium	19.3	57.9	35.8	37.6	35.2	36.4	32.9	33.4	32.2	30.2
Zinc	249	747	96.7	289	136	288	248	360	219	224
Cyanide	3.9	11.7	4.1	5.5	5.4	5	4.7	5.1	4.4	4.6
Percent Solids	63.5		60.8	45.1	46.3	49.6	53	49.3	56.5	54.8

indicates sample result exceeds three times background concentrations

Table 4
Sediment Sample Results

	X224 Background	3 X Background	X209	X210	X211	X212	X213	X214	X215	X216
Aluminum	6900	20700	17900	18500	18700	18800	19000	20500	21800	22800
Antimony	9.4	28.2	12.2	12.4	12.6	11.2	11.4	15.9	13.4	11.9
Arsenic	5.9	17.7	8.7	7.9	8.4	8	8.4	12.4	5.9	8.5
Barium	177	531	317	306	319	284	284	318	307	353
Beryllium	0.88	2.64	1.4	1.3	1.3	1.3	1.3	1.2	1.8	2.1
Cadmium	6	18.0	29.9	33.2	30.7	70	37.9	57.6	128	108
Calcium	5200	15600	7830	7350	7580	6570	7560	7250	8400	6570
Chromium	10.9	32.7	25.1	25.3	25.7	25.4	26.9	31.3	30.5	31.8
Cobalt	7.9	23.7	13	10.3	10.5	9.4	9.5	13.3	11.1	9.9
Copper	37	111	118	128	118	178	138	724	527	971
Iron	8790	26370	25400	24000	24200	22300	21700	23700	23800	25100
Lead	50.4	151.2	69.9	70.9	67.2	91.8	79.4	496	339	448
Magnesium	2380	7140	5000	4970	5030	4750	4840	5150	5350	5850
Manganese	245	735	681	520	598	299	217	215	233	303
Mercury	0.03	0.09	0.062	0.093	0.07	0.11	0.091	0.43	0.18	0.27
Nickel	18.6	55.8	107	73.7	76.2	80.1	90.6	150	227	192
Potassium	1540	4620	3110	3200	3260	3210	3440	4010	3960	4290
Selenium	0.8	2.40	2.4	2.1	1.9	2.4	3	17.2	5.1	3
Silver	0.64	1.92	2	2.1	2.1	1.9	1.9	2.7	2.2	2
Sodium	217	651	1010	1030	1050	936	947	1330	1110	1210
Thallium	3.9	11.7	5.1	5.2	5.2	3.1	3.2	5.5	4.5	4.3
Vanadium	19.3	57.9	39.9	34.3	35.2	34.6	40.6	44.7	42.2	41.7
Zinc	249	747	472	471	433	653	449	784	1090	1240
Cyanide	3.9	11.7	5.1	5.2	5.2	4.7	4.7	6.6	5.6	5
Percent Solids	63.5		48.8	47.9	47.7	53.4	52.8	37.7	44.4	50.4

indicates sample result exceeds three times background concentrations

Table 4
Sediment Sample Results

	X224 Background	3 X Background	X217	X218	X219	X220	X221	X222	X223
Aluminum	6900	20700	14100	9930	24900	27100	12600	6300	11000
Antimony	9.4	28.2	9.1	7.8	17.5	21.4	16.8	9.2	0.89
Arsenic	5.9	17.7	8	8.4	11.3	20.6	11.8	4.2	11.8
Barium	177	531	159	197	574	593	306	216	273
Beryllium	0.88	2.64	1	0.64	3.7	4.3	1.6	0.79	2
Cadmium	6	18.0	0.75	1.5	715	3760	53.8	47.9	22.9
Calcium	5200	15600	4260	2640	12600	24400	9660	4340	8680
Chromium	10.9	32.7	19	13.9	66.3	43	20.8	9.8	17.5
Cobalt	7.9	23.7	9.7	6.8	17.4	15.2	14	6.8	10.1
Copper	37	111	25	78.4	10600	5870	672	105	3270
Iron	8790	26370	24100	12100	26200	32500	24300	13100	14800
Lead	50.4	151.2	19.5	69.1	5700	9410	209	49.2	794
Magnesium	2380	7140	4790	2550	5630	5720	5220	2610	4130
Manganese	245	735	479	446	247	1090	594	241	374
Mercury	0.03	0.09	0.15	0.13	3.9	5.1	0.075	0.033	0.084
Nickel	18.6	55.8	32.9	28.5	444	301	515	140	1980
Potassium	1540	4620	2240	2470	4430	4000	3990	2110	2030
Selenium	0.8	2.40	0.86	1.1	44.5	57.7	2.6	1.6	2.8
Silver	0.64	1.92	1.5	1.3	21.4	12.3	1.3	0.37	6.1
Sodium	217	651	1570	1150	2080	1520	1240	388	1100
Thallium	3.9	11.7	1.8	1.1	20	82.5	2.9	2	1.5
Vanadium	19.3	57.9	31.4	22.7	54.1	54.6	32.1	17.5	23.3
Zinc	249	747	82.6	218	4970	18500	1020	395	1980
Cyanide	3.9	11.7	3.7	3.2	8.8	7.5	7	3.8	5.1
Percent Solids	63.5		66.9	77.3	28.5	33.2	35.8	65.9	48.8

indicates sample result exceeds three times background concentrations

Table 5
Inorganic Monitoring Well Results

Sample Number :	MCLs	ME00G3		ME00G4		ME00G6		ME00G5		ME00H6		ME00G7		ME00G9		ME00H0		ME00H1		ME00H7	
Sampling Location :		G201		G202		G203		G204		G205		G201F		G202F		G203F		G204F		G205F	
Matrix :		Water		Water		Water		Water		Water		Water		Water		Water		Water		Water	
Units :		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Date Sampled :		5/14/2008		5/14/2008		5/14/2008		5/14/2008		5/14/2008		5/14/2008		5/14/2008		5/14/2008		5/14/2008		5/14/2008	
Time Sampled :																					
%Solids :		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
Dilution Factor :		1.0		1.0		10.0		1.0		1.0		1.0		1.0		10.0		1.0		1.0	
ANALYTE	ppb	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM																					
ANTIMONY	6	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
ARSENIC	10	2.7		2.9		108		22.5		0.21	J	2.1		2.4		109		9		0.18	J
BARIUM	2000	102		97.8		35.8		123		10	U	35.3		35.4		10.9		78.4		10	U
BERYLLIUM	4	1	U	1	U	1.6		1	U	1	U	1	U	1	U	1.5		1	U	1	U
CADMIUM	5	1	U	1	U	53.5		1	U	1	U	1	U	1	U	53.6		1	U	1	U
CALCIUM																					
CHROMIUM	100	2.2	J	2.1	J	2	UJ	2	UJ	2	UJ	2	UJ	2	UJ	2	UJ	2	UJ	2	UJ
COBALT		2.6	J+	2.6	J+	111	J	1.1	J+	1	UJ	1.1	J+	1	J+	112	J	1	UJ	1	UJ
COPPER	1300	8	J	7.8	J	36700	J	11.1	J	2	UJ	2	UJ	2	UJ	26100	J	2	UJ	2	UJ
IRON																					
LEAD	15	4.6	J	4.6	J	4.3	J	15	J	1	UJ	1	UJ	1	UJ	1.1	J	1	UJ	1	UJ
MANGANESE		458		413		7010		796		1	U	308		307		7020		243		61.5	
MERCURY	2	0.2	U	0.2	U	0.89		0.2	U	0.2	U	0.2	U	0.2	U	0.87		0.2	U	0.2	U
NICKEL		13.9	J	13.6	J	23100	J	4.4	J	1	UJ	10.1	J	10.4	J	17200	J	2.6	J	1	UJ
POTASSIUM																					
SELENIUM	50	13.1		14.3		536		16.2		0.43	J-	15.2		15.6		540		16.3		5	U
SILVER		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
SODIUM																					
THALLIUM	2	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
VANADIUM		5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
ZINC		19.6		21		9160		41.1		2.2	U	7.6	U	7.9	U	9130		3.7	U	2	U
CYANIDE	200	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U

exceeds three times the MCL

Table 6
Residential Inorganic Results

Sample Number :	MCLs	ME00H2		ME00H3		ME00H4		ME00H5	
Sampling Location :		G101		G102		G103		G104	
Matrix :		Water		Water		Water		Water	
Units :		ug/L		ug/L		ug/L		ug/L	
Date Sampled :		5/13/2008		5/13/2008		5/13/2008		5/13/2008	
Time Sampled :									
%Solids :		0		0		0		0	
Dilution Factor :		1		1		10		1	
ANALYTE	ppb	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM		222	U	29.4	J	222	U	30.5	J
ANTIMONY	6	66.7	U	66.7	U	66.7	U	66.7	U
ARSENIC	10	11.1	U	11.1	U	8.1	J-	7.8	J-
BARIUM	2000	185	J	543		115	J	115	J
BERYLLIUM	4	5.6	U	5.6	U	5.6	U	5.6	U
CADMIUM	5	0.16	J	5.6	U	0.16	J	0.14	J
CALCIUM		120000		130000		50900		50700	
CHROMIUM	100	11.1	U	11.1	U	11.1	U	11.1	U
COBALT		55.6	U	55.6	U	55.6	U	55.6	U
COPPER	1300	27.8	U	6.2	J	14.4	J	14.7	J
IRON		1560		3600		144		152	
LEAD	15	11.1	U	11.1	U	11.1	U	11.1	U
MAGNESIUM		29100		31600		10300		10300	
MANGANESE		150		400		16.7	U	16.7	U
MERCURY	2	0.2	U	0.2	U	0.2	U	0.2	U
NICKEL		1.4	J	1.4	J	0.99	J	1.1	J
POTASSIUM		4560	J	5020	J	2300	J	2280	J
SELENIUM	50	38.9	U	38.9	U	38.9	U	38.9	U
SILVER		2.1	J-	2.2	J-	11.1	U	11.1	U
SODIUM		59000		23500		6510		6370	
THALLIUM	2	27.8	U	27.8	U	27.8	U	27.8	U
VANADIUM		55.6	U	55.6	U	1	J	1.4	J
ZINC		66.7	U	190		66.7	U	66.7	U
CYANIDE	200	10	U	10	U	10	U	10	U

Table 7
Monitoring Well Organic Sample Results

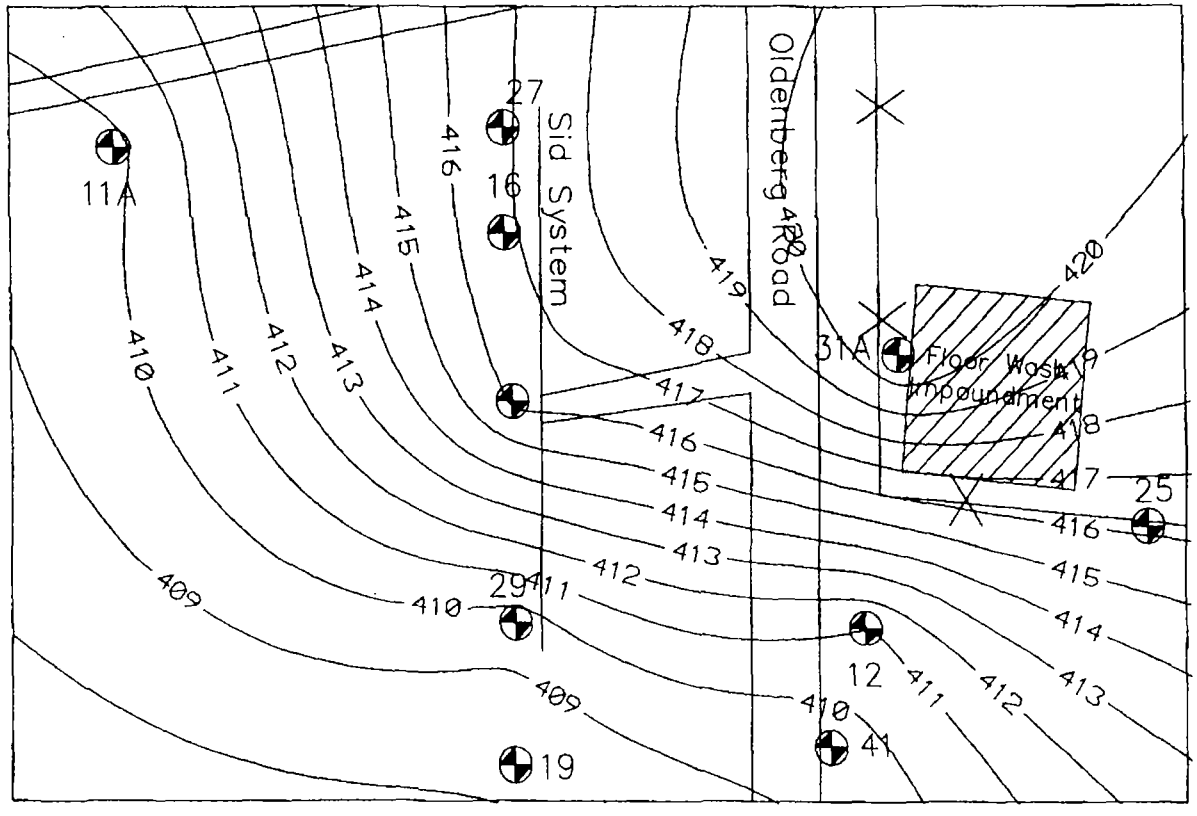
Sample Number :	E00G3		E00G4		E00G6		E00G5	
Sampling Location :	G201		G202		G203		G204	
Matrix :	Water		Water		Water		Water	
Units :	ug/L		ug/L		ug/L		ug/L	
Date Sampled :	5/14/2008		5/14/2008		5/14/2008		5/14/2008	
Time Sampled :								
%Moisture :	N/A		N/A		N/A		N/A	
pH :	2		2		2		2	
Dilution Factor :	1		1		1		1	
Volatile Compound	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Dichlorodifluoromethane	5	U	5	U	5	U	5	U
Chloromethane	5	U	5	U	5	U	5	U
Vinyl chloride	5	U	5	U	5	U	5	U
Bromomethane	5	U	5	U	5	U	5	U
Chloroethane	5	U	5	U	5	U	5	U
Trichlorofluoromethane	5	U	5	U	5	U	5	U
1,1-Dichloroethene	5	UJ	5	U	5	U	5	U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	U	5	U	5	U	5	U
Acetone	10	U	10	U	10	U	10	U
Carbon disulfide	5	U	5	U	5	U	5	U
Methyl acetate	5	U	5	U	5	U	5	U
Methylene chloride	5	U	5	U	5	U	5	U
trans-1,2-Dichloroethene	5	UJ	5	U	5	U	5	U
Methyl tert-butyl ether	5	U	5	U	5	U	5	U
1,1-Dichloroethane	5	U	5	U	5	U	5	U
cis-1,2-Dichloroethene	5	UJ	5	U	4.5	J	5	U
2-Butanone	10	U	10	U	10	U	10	U
Bromochloromethane	5	U	5	U	5	U	5	U
Chloroform	5	U	5	U	5	U	5	U
1,1,1-Trichloroethane	5	U	5	U	5	U	5	U
Cyclohexane	5	U	5	U	5	U	5	U
Carbon tetrachloride	5	U	5	U	5	U	5	U
Benzene	5	U	5	U	5	U	5	U
1,2-Dichloroethane	5	U	5	U	5	U	5	U
1,4-Dioxane	100	R	100	R	100	R	100	R
Trichloroethene	5	U	5	U	15		5	U
Methylcyclohexane	5	U	5	U	5	U	5	U
1,2-Dichloropropane	5	U	5	U	5	U	5	U
Bromodichloromethane	5	U	5	U	5	U	5	U
cis-1,3-Dichloropropene	5	U	5	U	5	U	5	U
4-Methyl-2-pentanone	10	U	10	U	10	U	10	U
Toluene	5	U	5	U	5	U	5	U
trans-1,3-Dichloropropene	5	U	5	U	5	U	5	U

Table 8
XRF Results

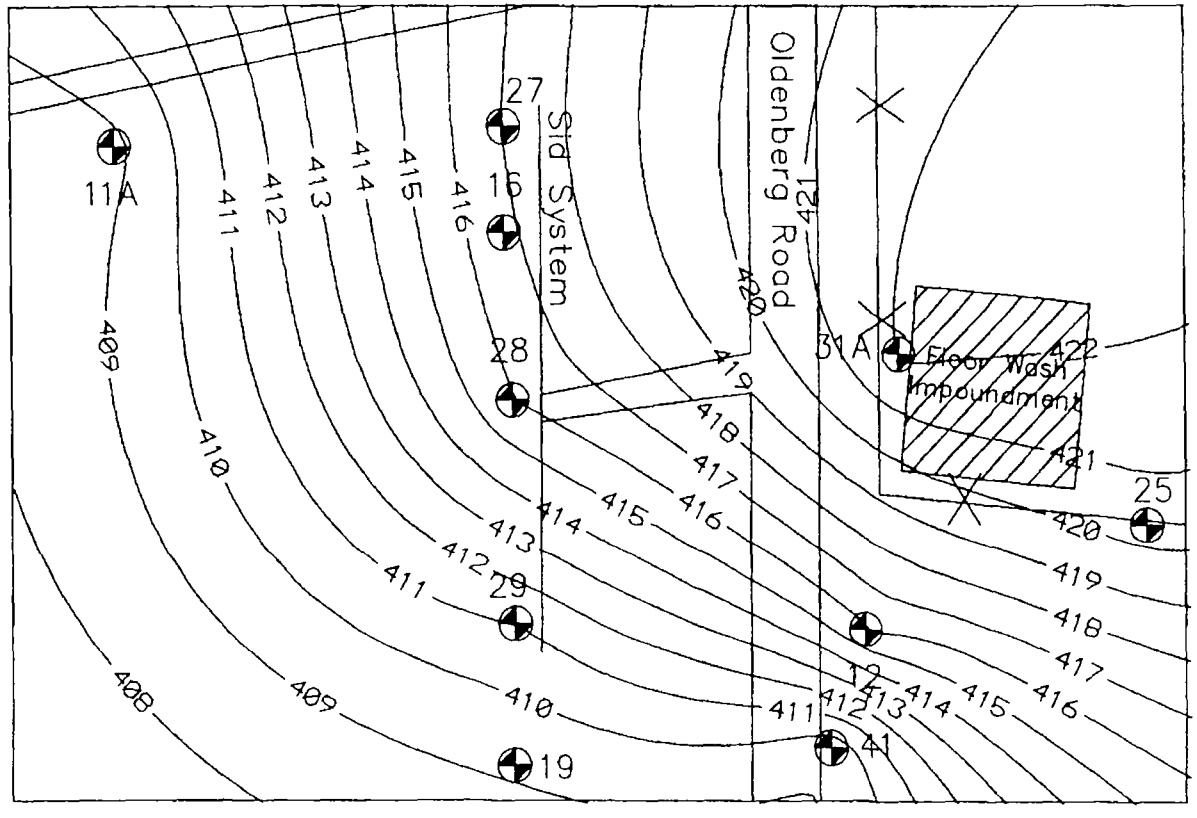
XRF No	Zr	Zr Error	Rb	Rb Error	Pb	Pb Error	Zn	Zn Error	Fe	Fe Error	Mn	Mn Error	Cr	Cr Error
12	128.8	16.6	41.7	13.6	41.5	24.2	146.3	54.6	7424	600	<LOD	660	<LOD	255
13	255	23.4	56	15.8	60.5	27.7	218.2	64.5	6358.4	570	<LOD	660	<LOD	270
14	166.5	17.6	42.1	12.9	44.8	22.8	213	57.5	5148.8	470	<LOD	510	<LOD	195
15	151	18.5	45.4	14.6	306.4	51.1	1189.6	120	7948.8	640	<LOD	690	<LOD	300
16	71.1	11.4	25.9	9.9	63.8	23	202.4	51	5609.6	450	<LOD	480	<LOD	195
17	116.6	17.3	57	16.4	146.8	38.7	554.4	92.8	10496	770	<LOD	825	573.2	250
18	136.1	16.2	40.1	12.7	195.8	37.8	302.4	64	5699.2	490	<LOD	555	<LOD	210
19	152.1	19.3	33	13.7	134.5	37.4	177.2	65.2	5168	530	<LOD	600	<LOD	240
20	168.1	16	48.9	12.3	46.1	20.7	60.3	39.3	4537.6	400	<LOD	480	<LOD	195
21	137.9	19	32.9	13.8	38.4	25.3	<LOD	79.2	10496	810	<LOD	855	<LOD	345
22	124.3	16.6	56.7	15.4	<LOD	32.55	<LOD	70.35	10995.2	750	<LOD	795	<LOD	270
23	134	18.5	44.5	15.2	<LOD	31.8	<LOD	80.1	12096	849.6	<LOD	870	<LOD	345
24	57.9	12.6	31.6	12.5	<LOD	31.05	<LOD	75.45	5968	570	<LOD	585	<LOD	225
25	103.3	15	40.7	13.2	52.9	25	119.5	51.3	8166.4	620	<LOD	645	<LOD	240
26	91.1	12.9	39.5	11.8	31.8	19.6	<LOD	61.95	5840	480	<LOD	510	<LOD	195
27	135.8	18.2	25.1	12.3	<LOD	31.05	99.5	54.7	8249.6	670	<LOD	720	<LOD	300
28	158.2	18.2	42.5	13.6	<LOD	28.95	<LOD	67.05	7475.2	600	<LOD	645	<LOD	255
29	184.8	23.7	26.8	14.5	<LOD	40.95	<LOD	79.95	6816	710	<LOD	795	<LOD	285
30	225.4	24.3	32.1	14.3	<LOD	38.4	<LOD	81.6	6905.6	660	<LOD	720	<LOD	270
31	179.3	20.4	23.8	12.2	<LOD	28.5	<LOD	72.6	4758.4	510	<LOD	555	<LOD	240
32	148.4	20.3	25.3	13.3	<LOD	36.3	<LOD	75.6	6848	660	<LOD	780	<LOD	270
33	176.6	18.2	38.6	12.6	34.1	22.4	<LOD	61.35	8716.8	620	<LOD	690	<LOD	270
34	195.6	20.2	38.6	13.4	<LOD	30	<LOD	62.55	7788.8	620	<LOD	705	<LOD	255
35	228.8	24.5	26.6	13.5	<LOD	37.35	<LOD	66.6	6880	660	<LOD	765	<LOD	285
36	109.6	15.1	46.5	13.7	<LOD	26.25	<LOD	68.85	10598.4	700	<LOD	720	<LOD	270
37	174.4	18.8	29.3	11.9	<LOD	28.5	<LOD	63.75	4707.2	480	653.6	400	<LOD	240
38	116.5	17.8	33.6	13.9	<LOD	33.6	<LOD	79.05	8857.6	740	<LOD	765	<LOD	270
39	181.6	21.3	36.1	14.3	<LOD	39.6	<LOD	73.8	4659.2	530	<LOD	600	<LOD	270
40	168.8	18.8	26.3	11.8	44.6	24.4	<LOD	64.8	4307.2	460	<LOD	510	<LOD	210
41	184.5	19.1	29.4	11.8	<LOD	32.4	<LOD	67.5	5888	520	<LOD	570	<LOD	225

Appendix C

Maps of Perched Shallow Groundwater Flow from CSD Environmental Services.



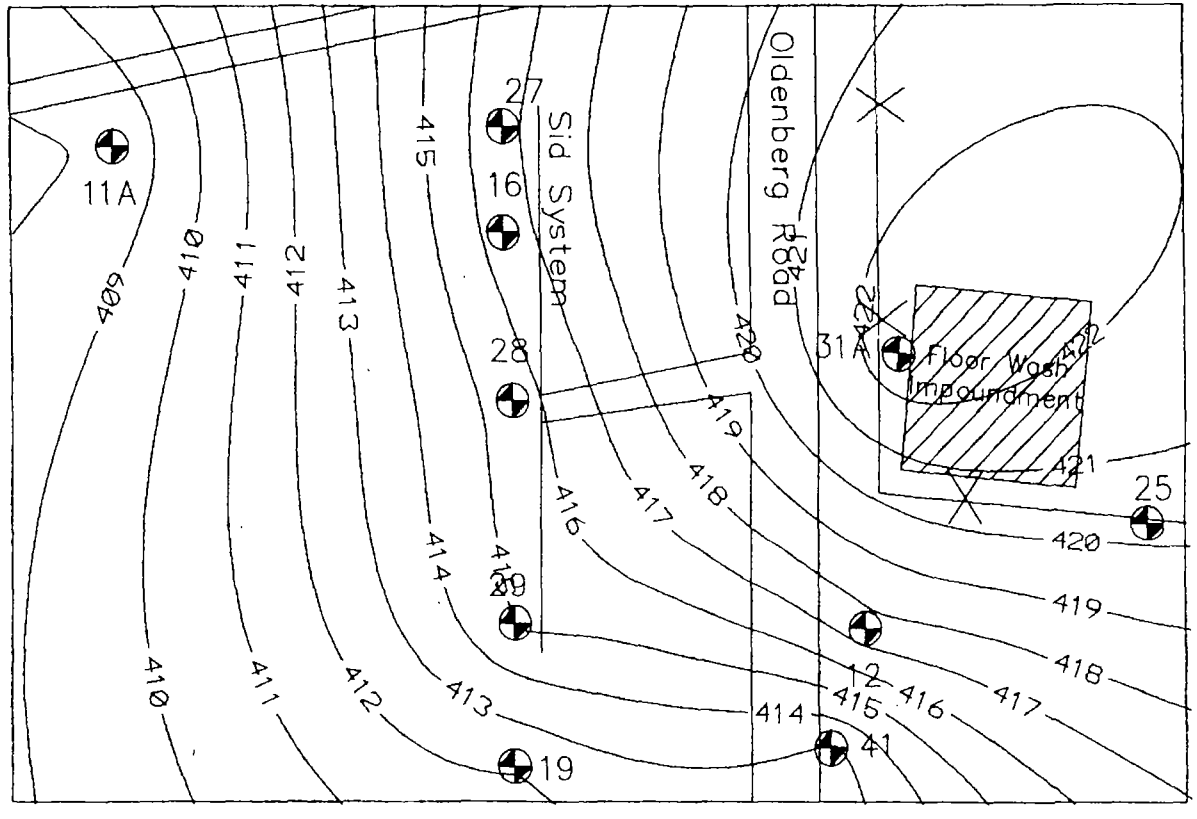
CHEMETCO INC. HARTFORD, IL.	FIGURE 7-3.1 GROUNDWATER FLOW DIRECTION FOR THE SHALLOW AQUIFER JANUARY 1996	CSD ENVIRONMENTAL SERVICES



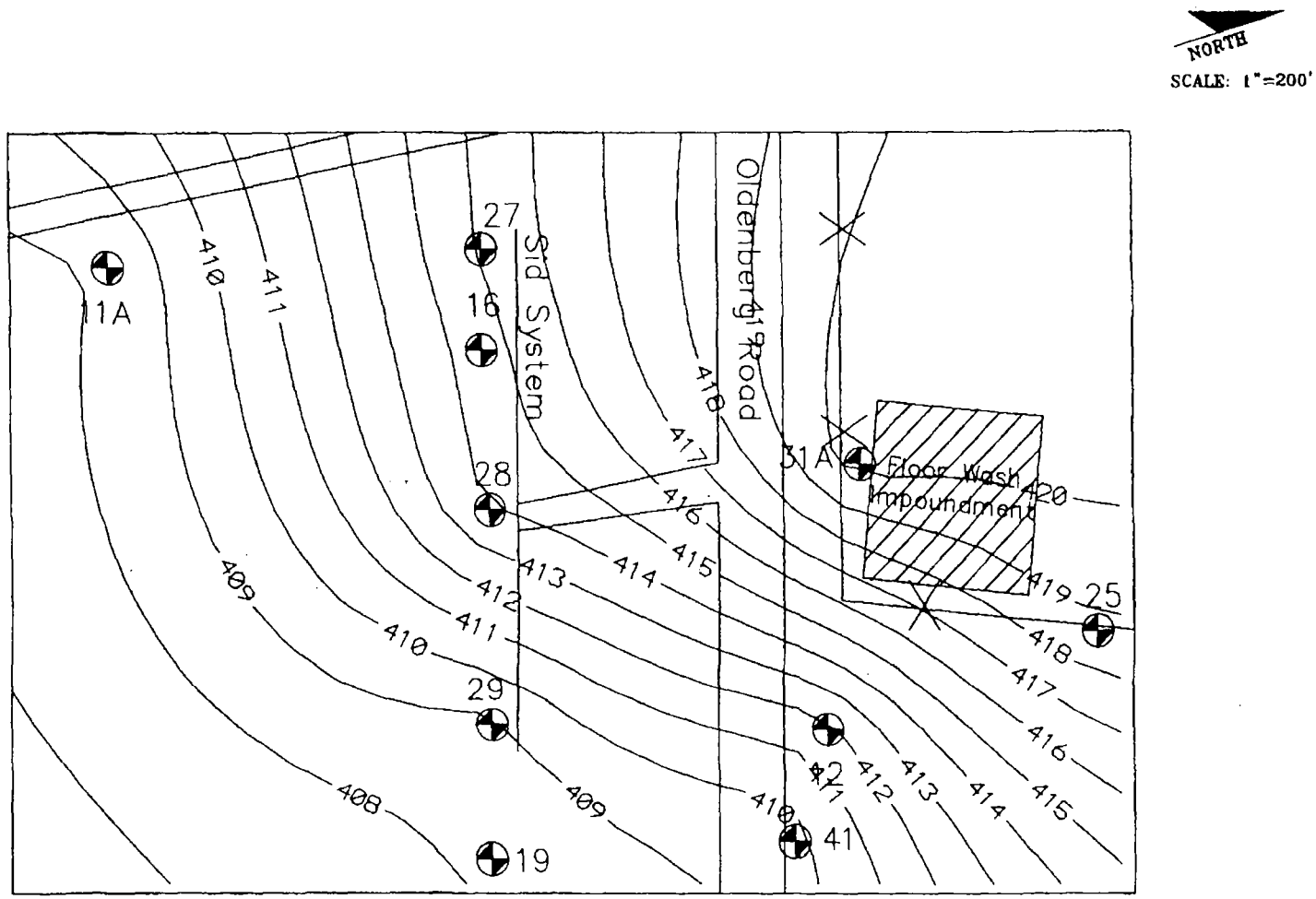
CHEMETCO INC.
HARTFORD, IL.

FIGURE 7-3.2
GROUNDWATER FLOW DIRECTION
FOR THE SHALLOW AQUIFER
APRIL 1996

CSD ENVIRONMENTAL SERVICES, INC.



CHEMETCO INC. HARTFORD, IL.	FIGURE 7-3.3 GROUNDWATER FLOW DIRECTION FOR THE SHALLOW AQUIFER JULY 1996	CSD ENVIRONMENTAL SERVICES



CHEMETCO INC. HARTFORD, IL.	FIGURE 7-3.4 GROUNDWATER FLOW DIRECTION FOR THE SHALLOW AQUIFER OCTOBER 1996	CSD ENVIRONMENTAL SERVICES, INC.

Appendix D

Sample Photographs

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

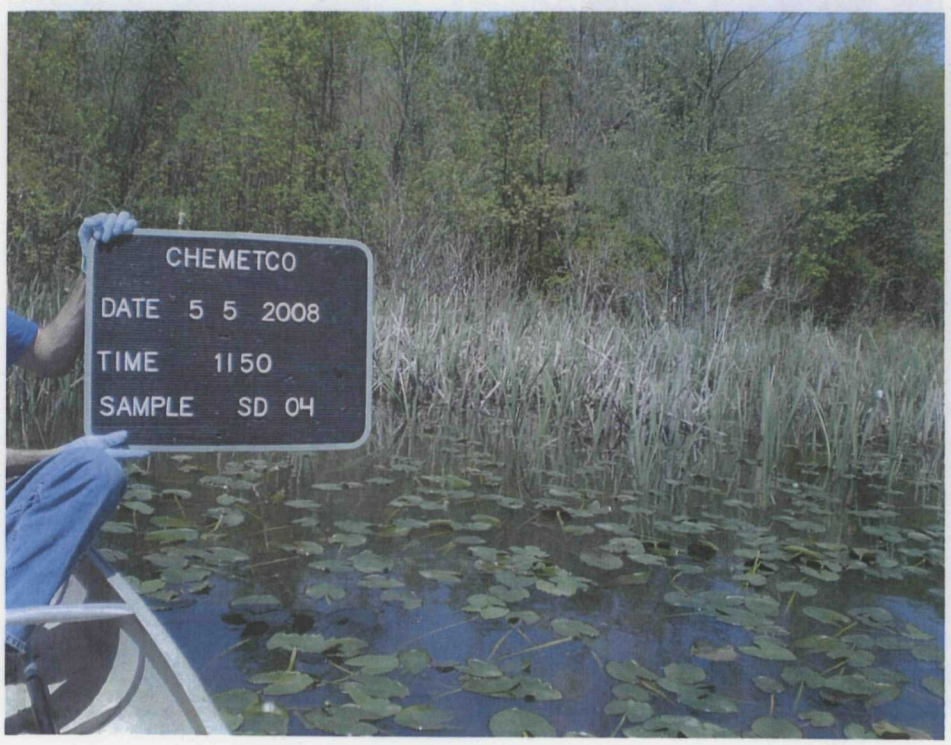
DATE: 05/05/08
TIME: 1100
PHOTO BY: L. Range
DIRECTION: SW
COMMENTS: SD01 correlates to X201. X201 was collected from 0-4 inches of sediment from a water depth of 2 ft. Sediment was a gray clay.

DATE: 05/05/08
TIME: 1110
PHOTO BY: L. Range
DIRECTION: NE
COMMENTS: Photo board is incorrect, should be sample SD02. SD02 correlates to X202 was collected from Long Lake near the township building. X202 was collected from a silty brown clay from a depth of 0-4 inches in 2 ft of water.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/05/08
TIME: 1130
PHOTO BY: L. Range
DIRECTION: NE
COMMENTS: SD03 correlates to X203. X203 was collected from a brown silt and clay mixture with little bits of gravel mixed in. X203 was collected from 0-4 inches from 2 ft of water.

DATE: 05/05/08
TIME: 1150
PHOTO BY: L. Range
DIRECTION: W
COMMENTS: SD04 correlates to X204, which was collected from a brown silty clay from a depth of 0-4 inches from 2 ft of water.



SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/05/08
TIME: 1200
PHOTO BY: L. Range
DIRECTION: SW
COMMENTS: SD05 correlates to X205. X205 was collected from a depth of 0-4 inches from a brown slightly stiff clay with some silt. Water depth was 3 ft.

DATE: 05/05/08
TIME: 1240
PHOTO BY: L. Range
DIRECTION: E
COMMENTS: SD06 correlates to X206. X206 was collected from a gray brown clay mixed with organic material from a depth of 0-4 inches. Water depth at this location was 3 ft.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/05/08
TIME: 1250
PHOTO BY: L. Range
DIRECTION: W
COMMENTS: SD07 correlates to X207. X207 was collected from a depth of 0-4 inches from a stiff mottled brown clay with a small amount of gravel with some silt. Water depth was 2.5 ft.

DATE: : 05/05/08
TIME: 1305
PHOTO BY: L. Range
DIRECTION: W
COMMENTS: SD08 correlates to X208. X208 was collected from a clayey silt which was gray brown in color. X208 was collected from a depth of 0-4 inches. Water depth at this location was 2 ft.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

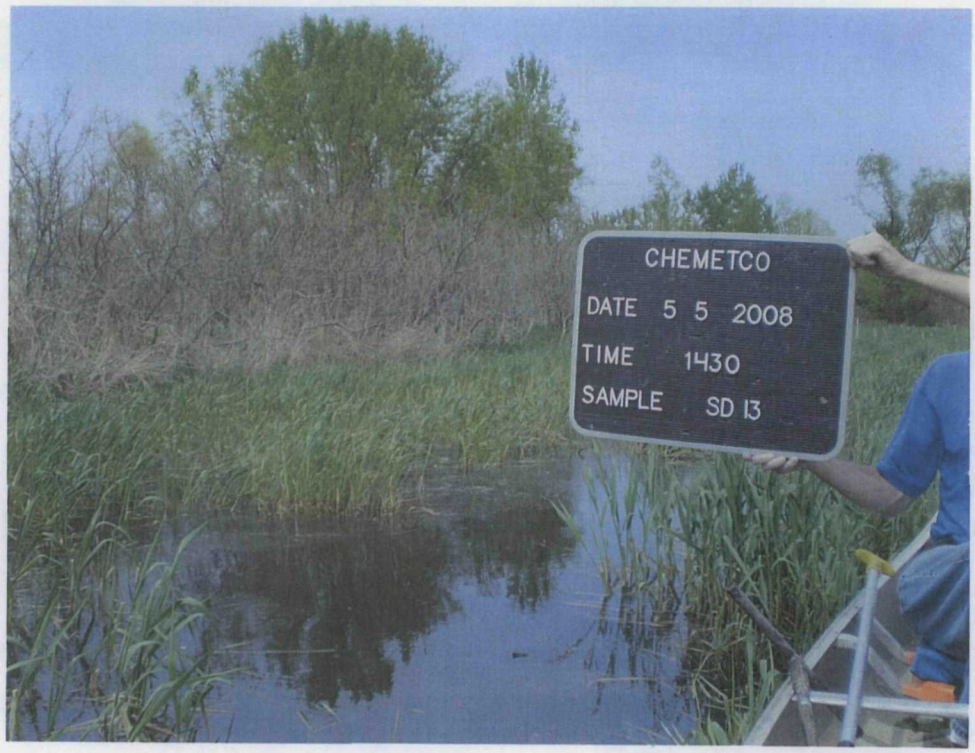
DATE: 05/05/08
TIME: 1325
PHOTO BY: L. Range
DIRECTION: SE
COMMENTS: SD09 correlates to X209. X209 was collected from 0-4 inches from a loose silty clay with organic matter. Water depth was 1.5 ft at this location.

DATE: : 05/05/08
TIME: 1340
PHOTO BY: L. Range
DIRECTION: S
COMMENTS: SD10 correlates to X210 and SD11 correlates to X211 (duplicate of X210). These samples were collected from a depth of 0-4 inches from a silty dark brown clay. Water depth at this location was approximately 3 feet.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/05/08
TIME: 1405
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: SD12 correlates to X212. X212 was collected from a depth of 0-4 inches from a gray brown silty clay. Water depth from this location was 2 ft.

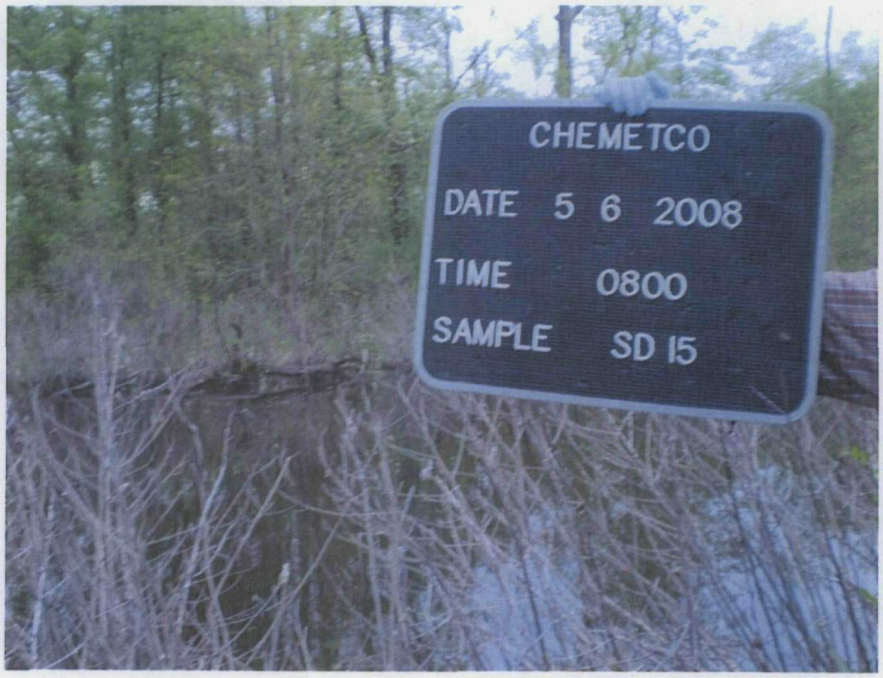
DATE: 05/05/08
TIME: 1430
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: SD13 correlates to X213. X213 was collected from a depth of 0-4 inches from a sitly clay which was brownish gray in color. Water depth at this location was 1 ft.



SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/05/08
TIME: 1620
PHOTO BY: L. Range
DIRECTION: S
COMMENTS: SD14 correlates to X214. X214 was collected from a silt with organic matter. X214 was collected from 0-4 inches. Water depth was approximately 1.5 ft.

DATE: 05/05/08
TIME: 0800
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: SD15 correlates to X215. X215 was collected from sediments consisting of a gray brown silt. The water depth at this location was 1 ft. This sample was collected from the shore.



SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 0820
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: SD16 correlates to X216. X216 was collected from 0-4 inches from gray silt from the shore. Water depth was approximately 1 ft.

DATE: 05/06/08
TIME: 0835
PHOTO BY: L. Range
DIRECTION: E
COMMENTS: SD17 correlates to X217. X217 was collected from the overflow from the retention pond to the east of the site. X217 was collected from the sediments on the dam where the water was overflowing. X217 consisted of light gray clay. Water depth was approximately 2 inches.

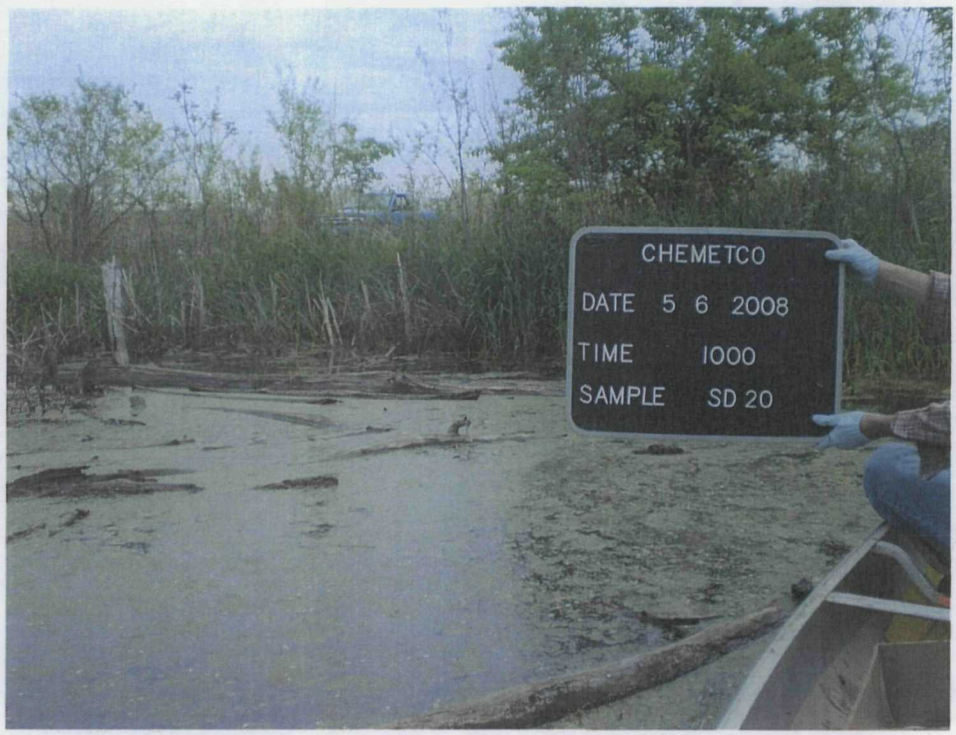
SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 0845
PHOTO BY: L. Range
DIRECTION: S
COMMENTS: SD18 correlates to X218. X218 was collected from the outflow of the pipe leading from the site. X218 consisted of a light gray clay. Water depth was approximately 6 inches.

DATE: 05/06/08
TIME: 0940
PHOTO BY: L. Range
DIRECTION: W
COMMENTS: SD 19 correlates to X219. X219 was collected from sediment from Long Lake near Chemetco. X219 consisted of black organic silty clay medium brown in color from a depth of 0-4 inches. Water depth was approximately 2 ft.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1000
PHOTO BY: L. Range
DIRECTION: NA
COMMENTS: SD20 correlates to X220. X220 was collected from the approximate confluence with the drainage from the west wetlands to Long lake. X220 consisted of a green brown soft clay. Water depth was approximately 2 ft.



DATE: 05/06/08
TIME: 1010
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: SD21 correlates to X221. X221 was collected in the portion of Long Lake to the SE of Chemetco. X221 consisted of a black silt clay mix from 0-4 inches. Water depth was 5 ft.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1020
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: SD22 correlates to X222. X222 was collected near the railroad tracks where Long Lake begins on the west. X222 consisted of a black silty orangic material from 0-6 inches. Water depth was 4 ft.

DATE: : 05/06/08
TIME: 1055
PHOTO BY: L. Range
DIRECTION: S
COMMENTS: SD23 correlates to X101. X101. X101 was collected from the zinc oxide spill area. X101 consisted of a light brown green material which was sandy silt. X101 was collected from 0-6 inches.

SITE NAME:	**Chemetco**
CERCLIS ID	**ILD 048 843 809** **COUNTY: Madison**

DATE: 05/06/08

TIME: 1615

PHOTO BY:
L. Range

DIRECTION: N

COMMENTS:
Picture taken of the drainage through the zinc oxide spill area. No vegetation was growing in this area.

DATE: : 05/06/08

TIME: 1110

PHOTO BY:
L. Range

DIRECTION: SE

COMMENTS: SD24 correlates to X223. X223 was collected from the approximate confluence from the drainage from the zinc oxide spill area to Long Lake. X223 was collected from 0-6 inches from a silty clay. Water depth was 1 ft.

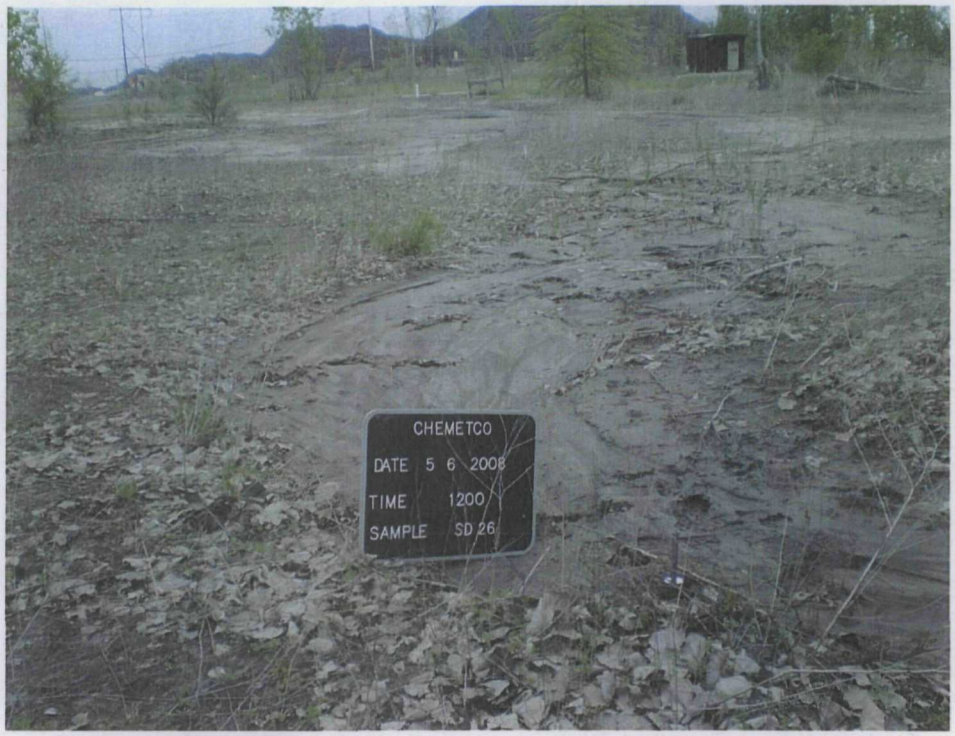
SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1120
PHOTO BY: L. Range
DIRECTION: SE
COMMENTS: SD25 correlates to X102. X102 was collected from the NE portion of the zinc oxide spill area. X102 consisted of a dark brown silty sand. X102 was collected from 0-6 inches.

DATE: 05/06/08
TIME: 0830
PHOTO BY: L. Range
DIRECTION: E
COMMENTS: Picture taken of the zinc oxide spill area from the southeastern corner of the spill area. Picture taken to the north, Chemetco in the background.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1200
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: SD26 correlates to X103. X103 was collected from the zinc oxide spill area. X103 consisted of a fluffy silty soil from 2 inches.



DATE: 05/06/08
TIME: 1205
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: SD27 correlates to X104. X104 was collected in the zinc oxide spill area, near the north end closer to Chemetco. Area was littered with green stained rocks. X104 consisted of a brown sitly soil with green rocks. Collected from 0-2 inches.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1225
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: X301 was collected from the slag covered asphalt area, just to the south of the main parking lot. X301 consisted of a black cindery gravel mix collected from a depth of 0-3 inches.

DATE: 05/06/08
TIME: 1225
PHOTO BY: L. Range
DIRECTION: SE
COMMENTS: X301 was collected from the slag covered asphalt area, just to the south of the main parking lot. X301 consisted of a black cindery gravel mix collected from a depth of 0-3 inches. Additional picture to show location.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1230
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: X302 was collected in the slag parking area to the south of the main parking area. X302 consisted of a fine silty sandy material, not much cinders but with some metal pieces.

DATE: 05/06/08
TIME: 1230
PHOTO BY: L. Range
DIRECTION: SE
COMMENTS: X302 was collected in the slag parking area to the south of the main parking area. X302 consisted of a fine silty sandy material, not much cinders but with some metal pieces. Additional picture to show location.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

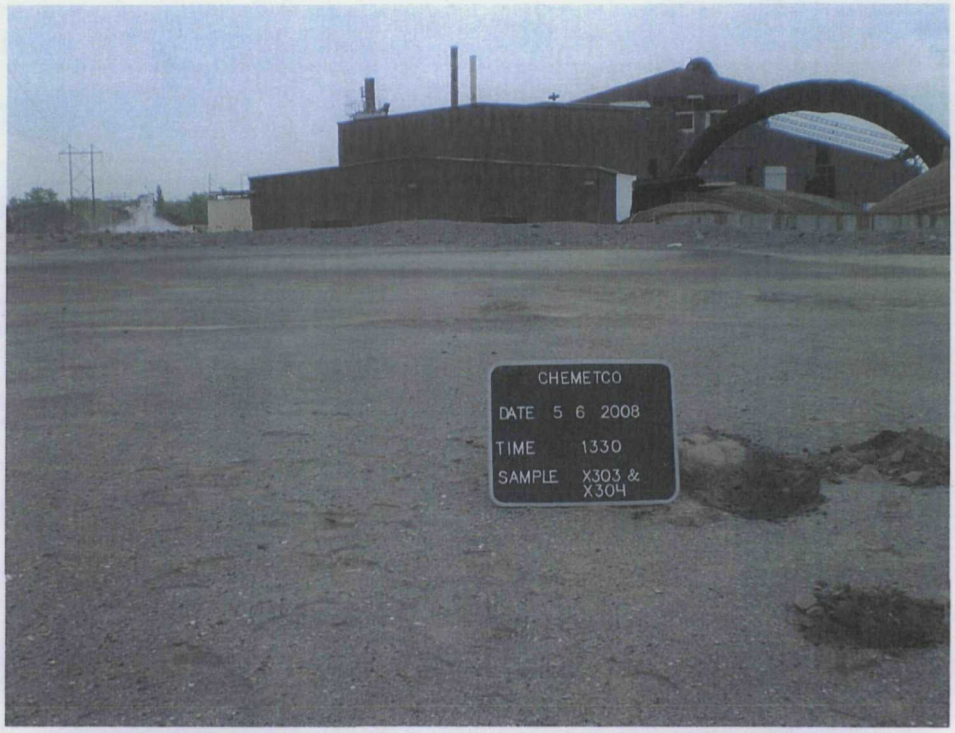
DATE: 05/06/08

TIME: 1330

PHOTO BY:
L. Range

DIRECTION: S

COMMENTS: X303 and X304 (dup) were collected from the top of the zinc oxide pile. Both samples consisted of sandy brown material (scrubber sludge) by Chemetco employees. Depth of sample collection was 4 inches.



DATE: 05/06/08

TIME: 1340

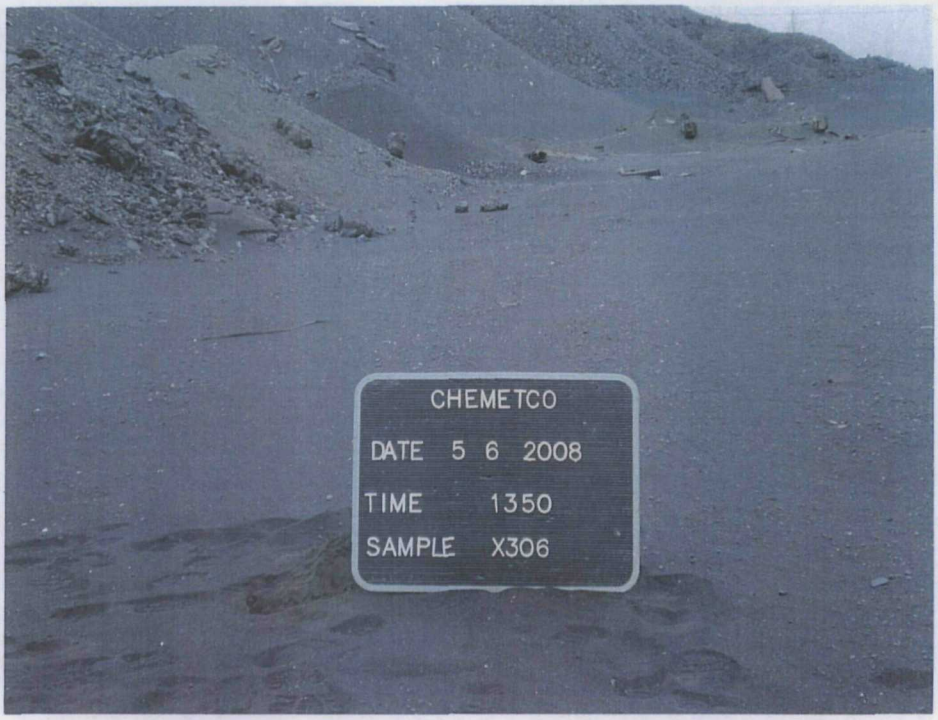
PHOTO BY:
L. Range

DIRECTION: S

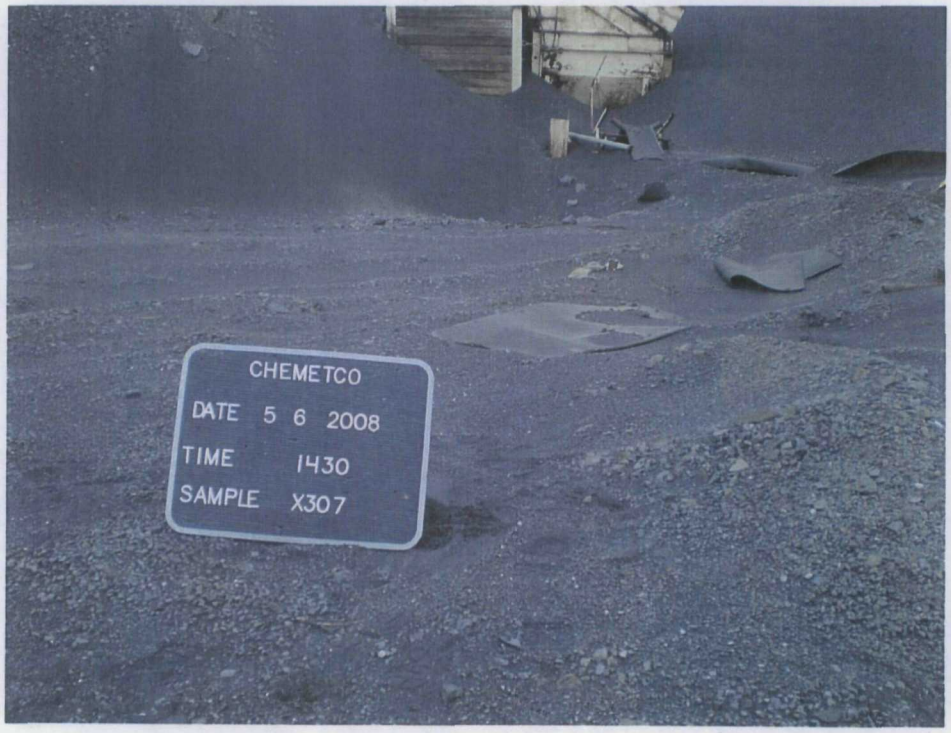
COMMENTS: X305 was collected from the east side of the zinc oxide pile (scrubber sludge). Sample consisted of a sandy brown material. Sample was collected from 2-4 inches.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1350
PHOTO BY: L. Range
DIRECTION: S
COMMENTS: X306 was collected from the fines located in the slag pile on the NE portion of Chemetco. X306 consisted of a fine black slag. Sample was collected from 0-6 inches.



DATE: : 05/06/08
TIME: 1430
PHOTO BY: L. Range
DIRECTION: W
COMMENTS: X307 was collected from a fine black slag located in the middle of the slag pile. Sample was collected from 0-6 inches.



SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1440
PHOTO BY: L. Range
DIRECTION: S
COMMENTS: X308 was collected from the south side of the site from fine located in the south slag pile. X308 was collected from a depth of 0-3 inches and consisted of a fine gray slag material with some reddish material mixed in.

DATE: : 05/06/08
TIME: 1445
PHOTO BY: L. Range
DIRECTION: E
COMMENTS: X309 was collected from the south slag pile from a dusty slag material with metal debris. X309 was collected from a depth of 0-2 inches.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1500
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: Photo taken of drainage in the zinc oxide spill area. Notice the light green scum in the flowing water. This scum was not moss or vegetation. Color is similar to tarnished copper.

DATE: 05/06/08
TIME: 1500
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: Photo taken of drainage in the zinc oxide spill area. Notice the light green scum in the flowing water. This scum was not moss or vegetation. Color is similar to tarnished copper.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1505
PHOTO BY: L. Range
DIRECTION: NW
COMMENTS: Picture taken of the zinc oxide spill area.

DATE: 05/06/08
TIME: 1510
PHOTO BY: L. Range
DIRECTION: NW
COMMENTS: X105 was collected from the zinc oxide spill area. Sample consisted of a light brown silty material. Sample depth was 0-6 inches.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/06/08
TIME: 1515
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: X106 was collected from a shallow gulley in the zinc oxide spill area containing a green stain. X106 consisted of dark brown silty material with green staining. Sample depth was 0-2 inches.

DATE: 05/07/08
TIME: 0915
PHOTO BY: L. Range
DIRECTION: S
COMMENTS: X224 was collected from the sediments of the drainage area to the east of the site. X224 consisted of a silty clay mix and was collected from 0-6 inches.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/07/08
TIME: 0920
PHOTO BY: L. Range
DIRECTION: N
COMMENTS: X107 was collected in the woods to the west of Chemetco. Sample was collected from a depth of 0-6 inches and consisted of a light brown silty soil.

DATE: 05/07/08
TIME: 0930
PHOTO BY: L. Range
DIRECTION: E
COMMENTS: X108 was collected from the edge of a field to the west of Chemetco. Sample was collected from a depth of 0-6 inches and consisted of a silty clay which was brown in color.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

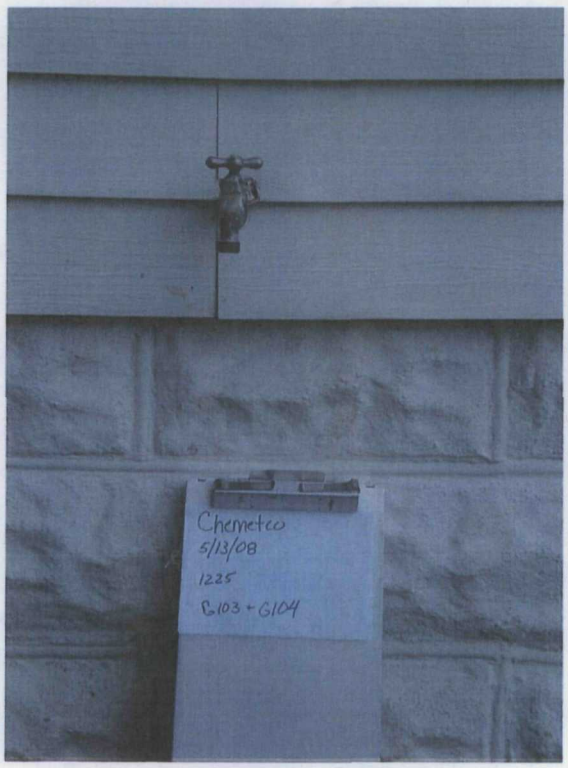
DATE: 05/13/08
TIME: 0955
PHOTO BY: L. Range
DIRECTION: S
COMMENTS: G101 was collected from a residential well located to the north of Chemetco. Sample was collected from an outside spigot. Well is 55 ft deep and was installed in April 2008. Only filtered water available.

DATE: 05/13/08
TIME: 1105
PHOTO BY: L. Range
DIRECTION: W
COMMENTS: G102 was collected from a residential well located to the north of Chemetco. Depth of this well was unknown.

SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/13/08
TIME: 1105
PHOTO BY: L. Range
DIRECTION: W
COMMENTS G102 was collected from a residential well located to the north of Chemetco. Depth of this well was unknown.

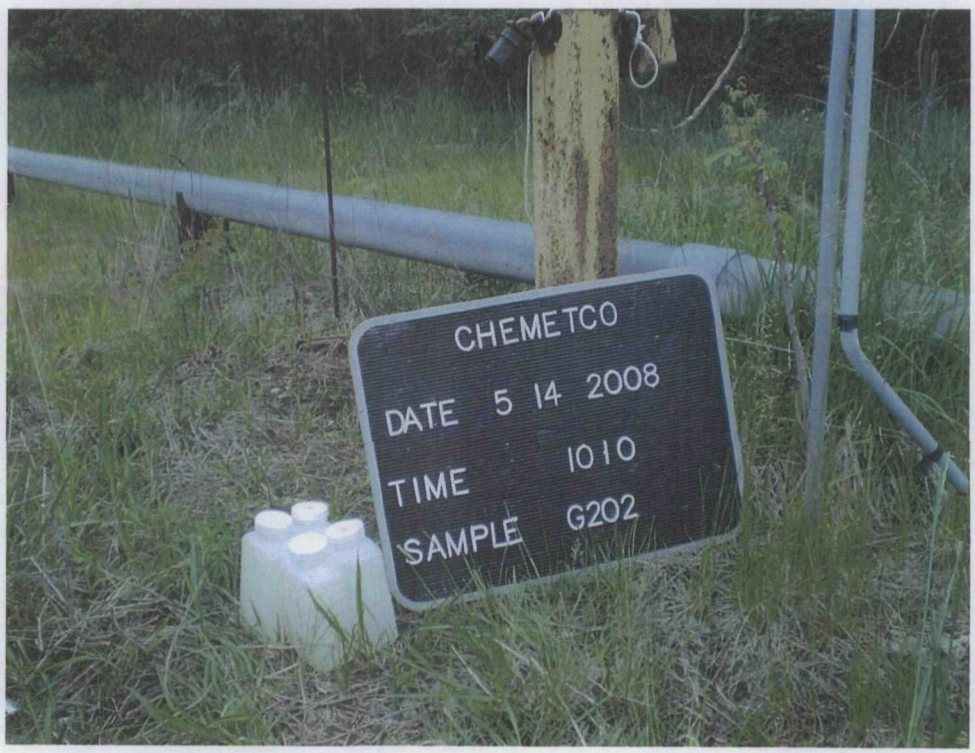
DATE: : 05/13/08
TIME: 1225
PHOTO BY: L. Range
DIRECTION: E
COMMENTS: G103 and G104 (dup) were collected from an outside spigot. Well is 42 feet deep. Sampled after 5 minutes due to owner stating that he was almost out of water. .



SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

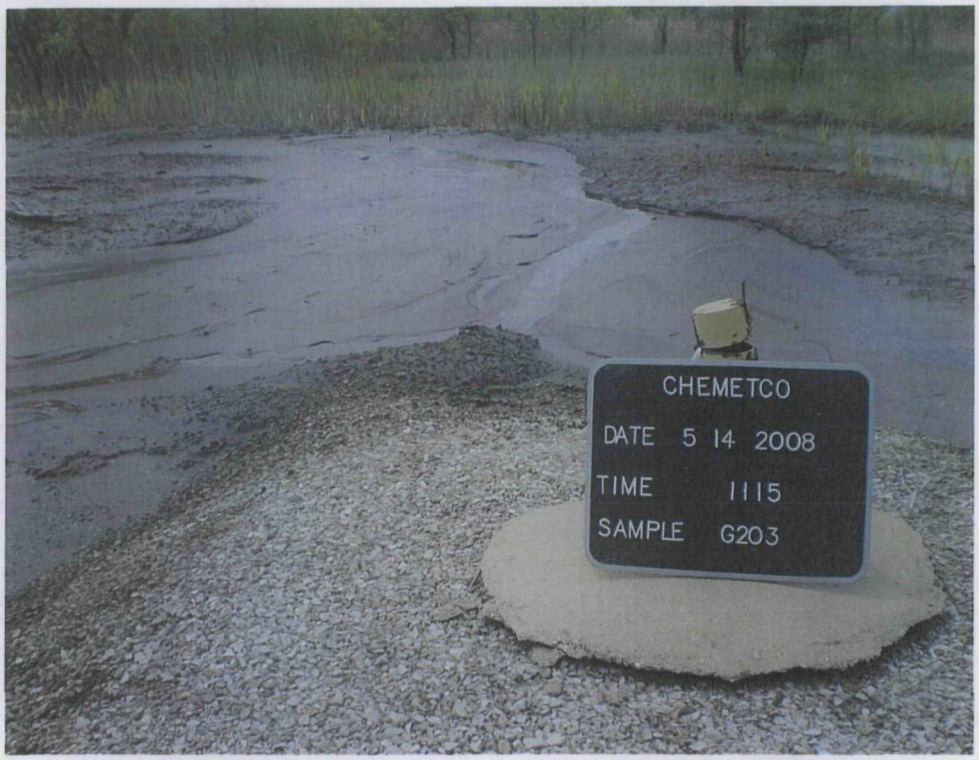
DATE: 05/14/08
TIME: 1010
PHOTO BY: L. Range
DIRECTION: NW
COMMENTS: G201 was collected from a monitoring well (MW 41) located to the east of Chemetco. According to Chemetco personnel this was a background location. Depth to water from ground was 12.6 feet. Well depth was 21.9 feet.

DATE: : 05/14/08
TIME: 1010
PHOTO BY: L. Range
DIRECTION: NW
COMMENTS: G202 (dup) was collected from a monitoring well (MW 41) located to the east of Chemetco. According to Chemetco personnel this was a background location. Depth to water from ground was 12.6 feet. Well depth was 21.9 feet.



SITE NAME: Chemetco	
CERCLIS ID ILD 048 843 809	COUNTY: Madison

DATE: 05/14/08
TIME: 1115
PHOTO BY: L. Range
DIRECTION: S
COMMENTS: G203 was collected from MW 16. Well depth was 10.2 feet with water located 1.5 feet from surface. MW was located in the zinc oxide spill area.



DATE: 05/14/08
TIME: 1330
PHOTO BY: L. Range
DIRECTION: W
COMMENTS: G204 was collected from MW 47R which is located on the north side of Chemetco inside the fence. Well depth was 50.25 feet with water located 18.05 feet from surface.